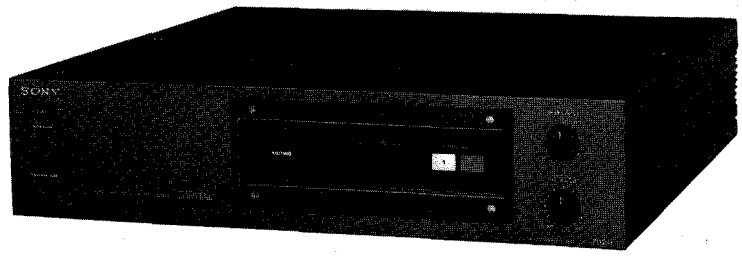
DAS-702ES

SERVICE MANUAL

US Model
AEP Model



SPECIFICATIONS

Converter section

Digital input (phono jacks)
  Input level (Sensitivity)
    0.5 Vp-p ±20%
  Impedance 75 ohms
Digital output (phono jacks)
  Output level (Voltage)
    0.5 Vp-p ±20%
  Impedance 75 ohms
    The input signal comes unprocessed to the digital output terminals via a buffer, only when the DAS-702ES is operating.
Number of channels
    2 (stereo)
Demodulation (D/A conversion)
    16-bit linear
Frequency response
    5 Hz–20 kHz ±0.5 dB
    (input digital signal sampling frequency: 44.1 kHz or higher)
Harmonic distortion
    Less than 0.004% at 1 kHz
    (input digital signal sampling frequency: 44.1 kHz or higher; 16-bit operation)
Dynamic range more than 95 dB
    (input digital signal sampling frequency: 44.1 kHz or higher; 16-bit operation)
Channel separation
    more than 90 dB

Outputs

	Output level	Output impedance	Matching load impedance	Type
FIXED LINE OUT	2 V (Digital signal, Max.)	100 ohms	10 kilohms or more	Phono jack × 2
VARIABLE LINE OUT	0–5 V (Digital signal, Max.)	100 ohms	10 kilohms or more	Phono jack × 2
HEAD-PHONES	0–14 mW (At 32 ohms) (Digital signal, Max.)	—	—	Stereo phone jack

–Continued on page 2–

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

D/A CONVERTER UNIT

SONY®

MICROFILM

AUD

General

System	D/A Converter
Power requirements	
	U.S.A. model: 120 V ac, 60 Hz
	AEP model: 220–240 V ac, 50/60 Hz
Power consumption	
	U.S.A. model: 25 watts
	AEP model: 28 watts
Dimensions	Approx. 430 × 105 × 410 mm (w/h/d) ($16\frac{7}{8} \times 4\frac{1}{8} \times 16\frac{1}{8}$ inches) including projecting parts and controls
Weight	Approx. 11.5 kg (25 lbs 6 oz) net
	Approx. 13.5 kg (29 lbs 13 oz) in shipping carton

SAFETY CHECK-OUT (US Model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

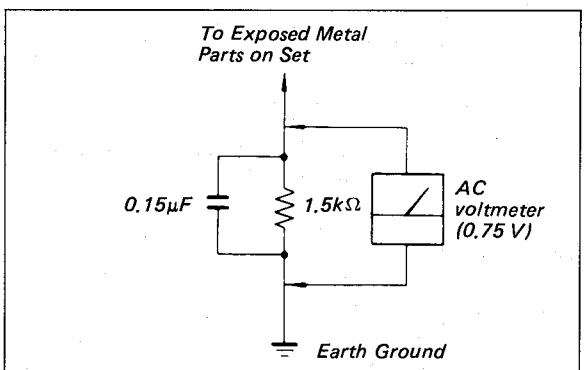
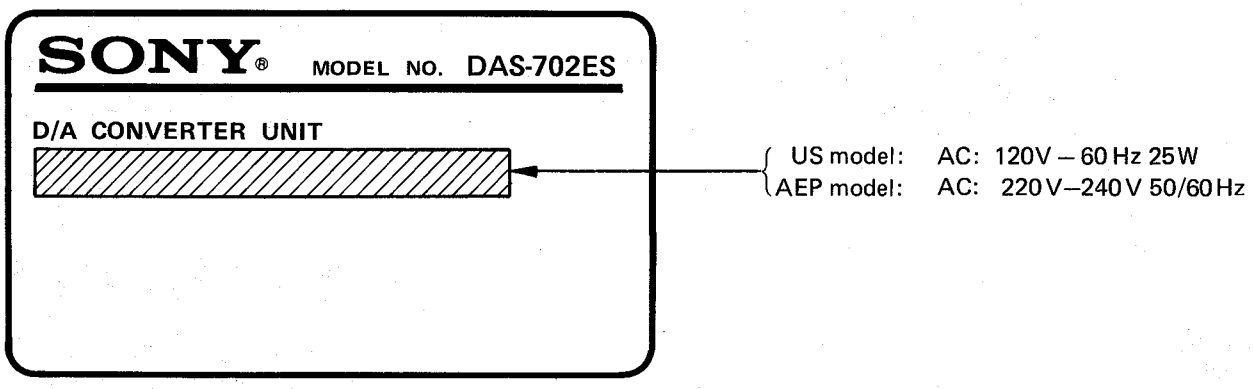


Fig. A. Using an AC voltmeter to check AC leakage.

MODEL IDENTIFICATION

– Specification Label –



FEATURES

The DAS-702ES is designed to substitute for the built-in D/A converter of the digital audio equipment like the compact disc player, for higher sound quality by directly converting digital signals to analog signals.

A large-capacity power transformer assures the reproduction of the clear treble and powerful bass of digital sources.

A large electrolytic capacitor filled with ceramic powder assures stable sound quality and characteristics.

The material of the wires used is LC-OFC (Linear crystal oxygen-free copper) in which crystal grain boundaries that impair sound quality are reduced.

The twin-mono construction of the D/A converter and audio circuits prevents interference between the L and R channels, providing good channel separation.

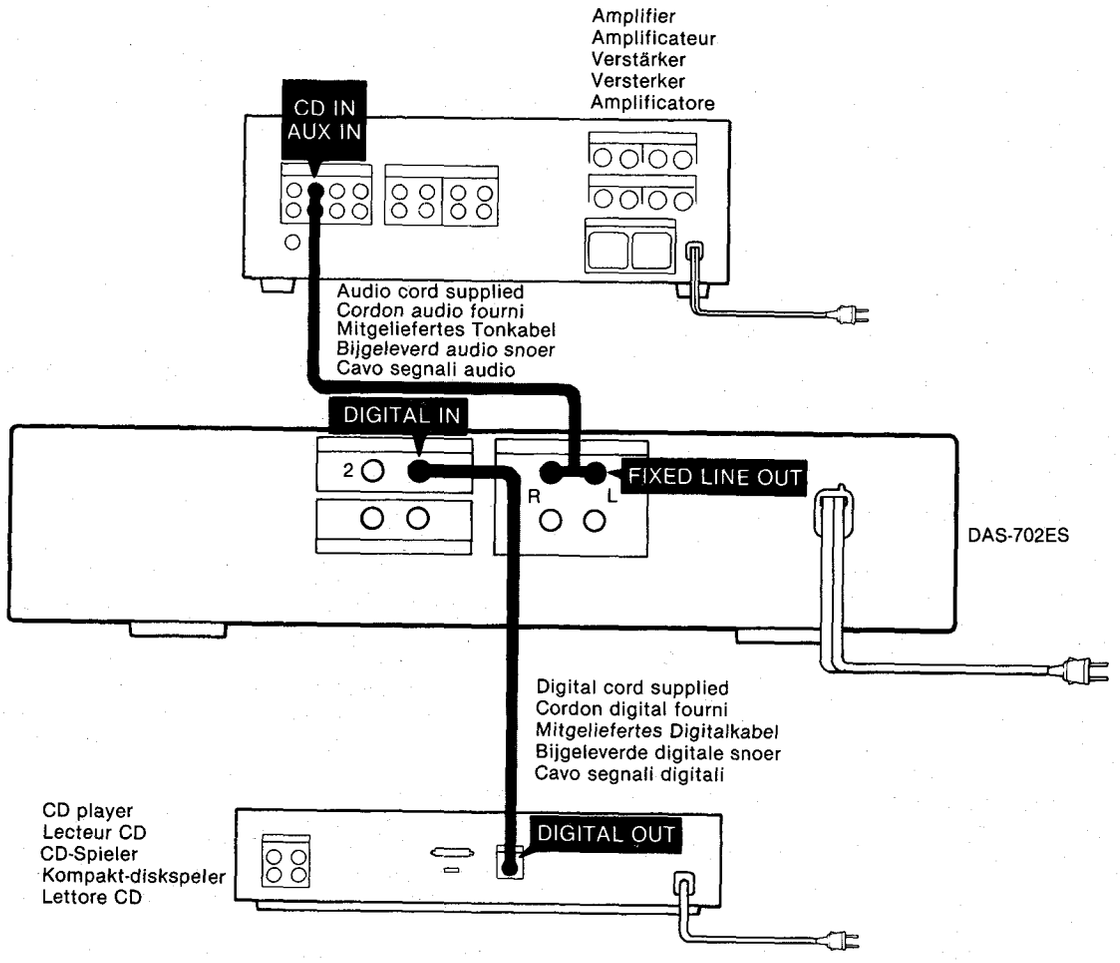
A newly developed digital filter provides superb phase characteristics.

The DAS-702ES automatically adapts itself to the sampling frequency of 32, 44.1, or 48 kHz.

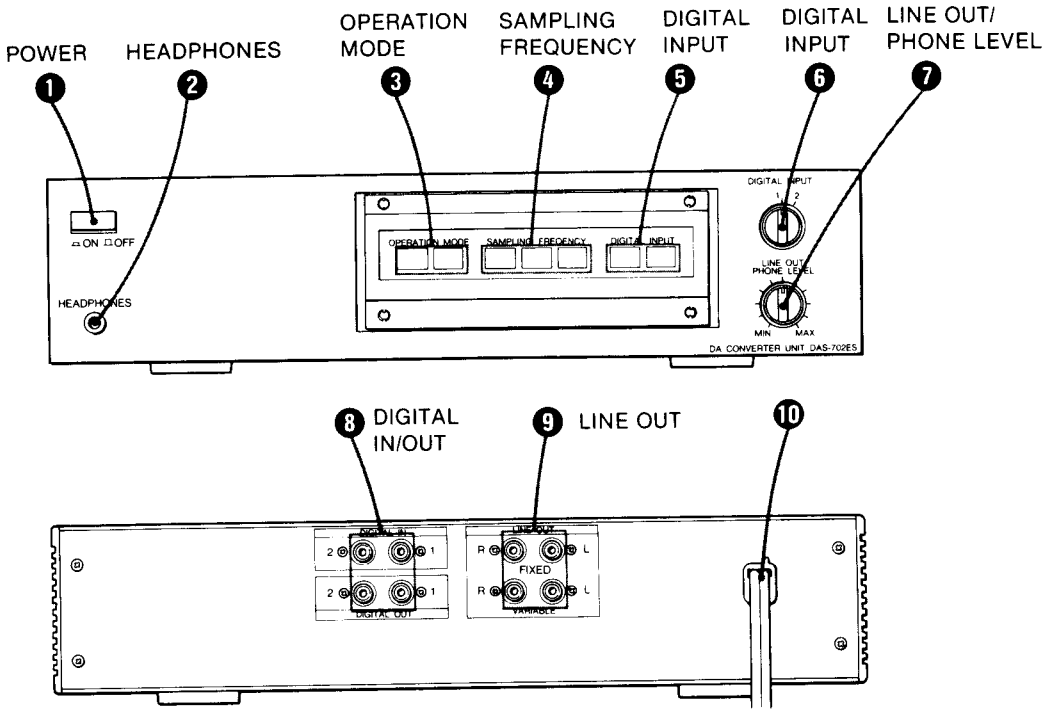
An input selector permits selection out of two input lines.

CONNECTION NOTES

- Before making connection, turn the POWER switch of the DAS-702ES off.
- Secure good connection between jacks and plugs. Inadequate connection can be a cause of noises.
- When removing a cord, pull the plug but not the cord, or the cord can be damaged.



FUNCTION OF CONTROLS



Front panel

❶POWER switch
Press to turn on power. Press again to turn off.

❷HEADPHONES jack
A stereo phone jack.

❸OPERATION MODE indicators
MUTING: Sounds get muted with the MUTING indicator lit in the following cases:
a) A few seconds after power-on.
b) No connection is made at the DIGITAL IN jacks.
c) No digital signal is coming in.
d) The program source equipment is not supplied with power.
OPERATING: This lights normally during operation.

❹SAMPLING FREQUENCY indicators
An indicator lights to indicate the sampling frequency of the digital program source.
44 kHz*: CD (compact disc)
32 kHz, **48 kHz**: expected in future.

* The sampling frequencies of 44.1 and 44.056 kHz are not distinguished: the "44 kHz" lights in both cases.

❺DIGITAL INPUT indicators
1: Lights when the source input to the DIGITAL IN 1 jack (rear panel) is selected.
2: Lights when the source of DIGITAL IN 2 is selected.

❻DIGITAL INPUT selector
1: Selects the digital program source input to the DIGITAL IN 1 jack.
2: Selects the source of DIGITAL IN 2.

❼LINE OUT/PHONE LEVEL control
Controls the level of VARIABLE LINE OUT (output to the rear panel jacks) and HEADPHONES signal.

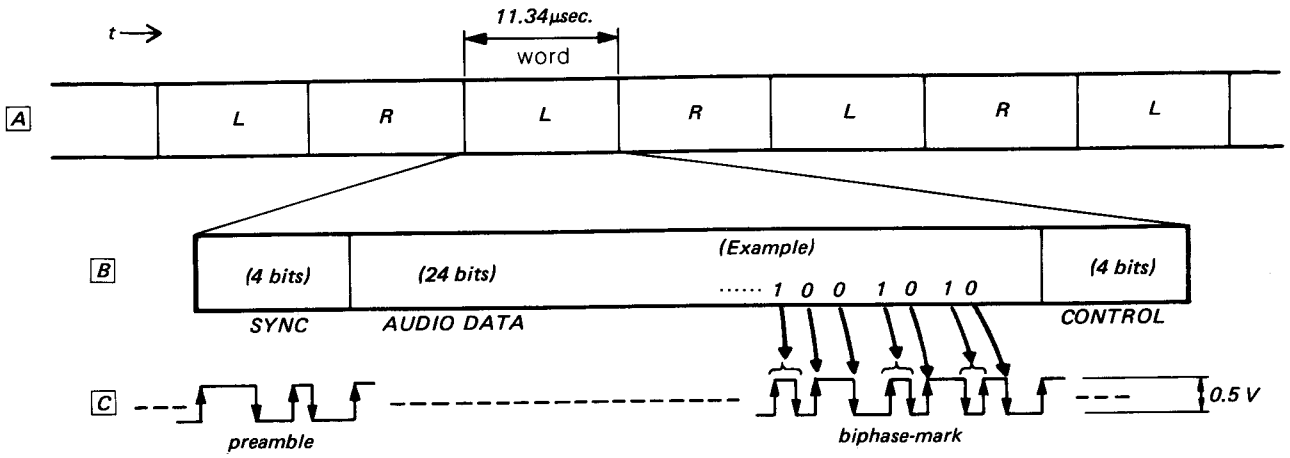
Rear panel

❽DIGITAL IN/OUT jacks
Phono jacks.
IN: Connect to the digital output jacks of a CD player, etc.
OUT: Auxiliary jacks of digital output.

❾LINE OUT jacks
Phono jacks. Connect these to the CD or auxiliary input jacks of the preamplifier.
FIXED: Output level is fixed (2 V rms max). Use these jacks ordinarily.
VARIABLE: Output level is variable (0–5 V rms max) according to the LINE OUT/PHONE LEVEL control setting. The VARIABLE jacks are useful for matching the output levels of the CD player and other program sources without changing the setting of the amplifier's volume control.

❿Power cord
A white mark is placed on one of the two prongs of the power plug. It permits to match the polarity, live and ground, of the power lines inside the equipment with that of the source in order to obtain higher sound quality.
Plug the power cord to an AC outlet in such a manner that the marked prong fits to the ground side of the outlet.

DAI (Digital Audio Interface) Transmission Method



L channel and R channel data are transmitted on one digital cable for the digital audio interface method. As shown in Figure [A], a time sharing multiplex transmission method is employed to transmit and receive L channel data and R channel data alternately. When the sampling frequency is 44.1 kHz (as in the case of CD), 44,100 data are transmitted in 1 second for L channel and R channel each, for a total of 88,200 data for both channels. The length of one channel data interval (word) is 11.34μsec.

One word is composed of 32 bits. The contents of the bits are shown in Figure [B].

The first 4 bits are the SYNC portion, for synchronization, and include the preamble, which is explained later. Next is the portion containing audio data, which is a 24 bit field. However, as with CD, 16 bits of audio data are most common, and at the present time the last 16 bits only are used. The final 4 bits are the control portion, which has data pertaining to emphasis ON/OFF, subcodes, and so on.

The assembled data has modulation, applied, and this is, called biphase marks, corresponding to one inversion for data 0 and two inversions for data 1. However, this does not apply to the SYNC portion, which has a special pattern called the preamble. Inversion correspondence according to the data is ignored in the preamble, and the period of time that high level continues is longer than for any other portion. On the reception side, the preamble is used at the D/A converter input portion to get sync.

The wave form in Figure [C] is when connection is by an RCA pin plug, transmitted at 0.5Vp-p level by a coaxial cable with 75Ω impedance. Therefore, commercially available coaxial cables with a pin plug (video connection cord, etc.) can be used, as well as the digital connection cord supplied with this set.

SECTION 1
CIRCUIT DESCRIPTION

1. Digital Section

This set's digital system extracts data from the signal sent in DAI (Digital Audio Interface) format, converts (doubles) the sample rate at the digital filter, and converts it to an analog signal with the D/A conversion IC. This set does not have its own crystal oscillator, so all of the clock and timing pulses are obtained from the input signals, by the PLL's. There are three PLL's, called RX PLL, D FIL PLL and APT PLL. Digital system in this set can be divided into 6 basic routes.

1-1. RX AMP Circuit

The input signal (0.5Vp-p) is amplified (IC701) to logic level (about 4Vp-p), and also the signal 2FSR for sync is made from the input signal, by edge detection (IC504) and mono-stable multivibrator (IC505). 2FSR is used as the target signal of the three PLL's. Also, this set has two input routes, which are switched by IC501.

1-2. RX Circuit (attached to RX PLL)

This consists of the DAI format decoder IC CX23053 (IC510) and the RX PLL which generates the 256fs clock for CX23053. IC507 is RX PLL's VCO, and oscillation frequency is 256fs. This is divided 1/128 at IC508 and phase compared to 2FSR. Phase comparision is done by IC506.

The DAI signal RX is timing corrected at D latch (IC509), then is input to CX23053 (IC510). CX23053 (IC510) output is LR alternating bit serial data and BCK, $\overline{\text{LRCK}}$ and WCK, which are for data timing determination. Among these, $\overline{\text{LRCK}}$ is inverted, and the others are sent as is to digital filter CX23034 (IC514). With CD player signal processing, BCK is 49fs (first generation CX7935) or 48fs (second generation CX23035), and there were spaces in the data, but this is not the case with CX23053 output data, and BCK is 32fs.

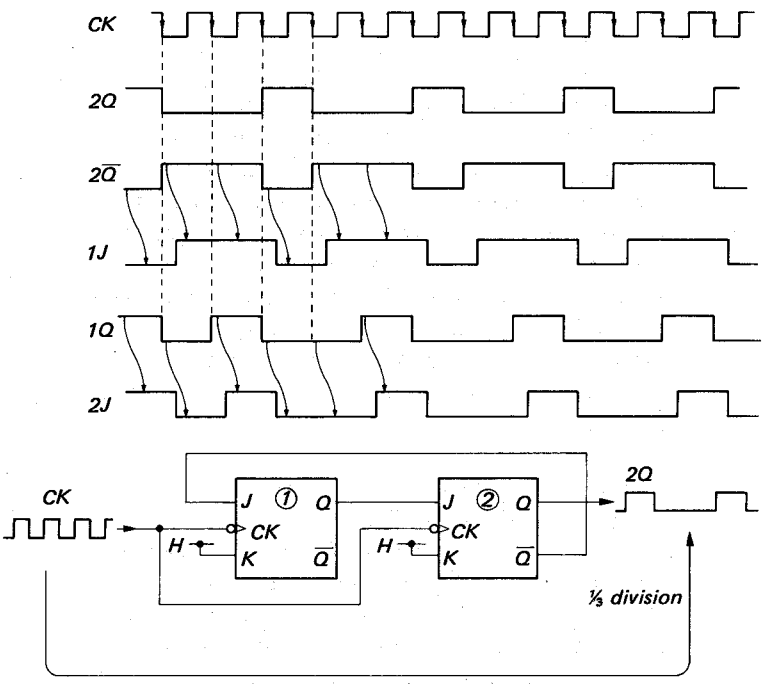
***fs: Sampling frequency**

On this set, the sampling frequency is 32kHz, 44.1kHz and 48kHz, so cannot be expressed simply as ◯◯kHz. For this reason, each frequency is expressed as a multiple of fs (for example, for 256fs, if fs=44.1kHz, then 11.2896MHz, and if fs=48kHz, 12.288MHz). On a CD player, fs=44.1kHz.

1-3. D FIL Circuit

This is composed of the digital filter CX23034 (IC514) and the D FIL PLL which generates its clock 384fs. D FIL PLL's VCO is IC517 and oscillation frequency is 384fs. This is divided 1/3 at IC520, divided 1/128 at IC519 and becomes 2fs, and is phase compared to 2FSR. Phase comparison is done by IC518. The timing chart for 1/3 division done by IC520 is shown in the timing chart below.

• 1/3 Divider Circuit using J-K flip-flop



J-K FF Truth Table

J	K	Q	Q̄
0	0	hold	
1	0	1	0
0	1	0	1
1	1	inversion	

The sampling rate is converted to double at the digital filter. (If the sampling frequency of data output from the digital filter is fds, then fds = 2fs. Refer to the Second Generation CD Player IC New Technical Theory for Servicing for details on the digital filter.) 18 bits worth of data are output, and there is a 6 bit space between the data. The bit clock BCK corresponds to the data and outputs 1 sample of 18+6 = 24 pulses, or 48 pulse (48fds) for L-CH and R-CH, and the rate relative to the original fs is 96fs.

The $\overline{\text{LRCK}}$ edge is at the 16th bit of data, making a division from the least significant 2 bits. LRCK18 output timing is when 18 bits worth of data output is completed, then it is later slightly delayed by A32FS and becomes LR18. LR18 is used as the D/A converter conversion start signal at its rising edge.

1-4. D/A Circuit

The data output from digital filter CX23034 (IC514) is input to the shift register SN74LS673 (IC101, 201) and is converted from serial to parallel.

Serial/parallel conversion latch timing pulse is $\overline{\text{LR18}}$, but the use of SN74LS673 differs for L-CH and R-CH (IC101, 201). For R-CH, this pulse is used to shift by getting the AND of BCK and $\overline{\text{LRCK}}$, but for L-CH, the shift is by the AND of BCK and LR18. However, LR18 is too long, so $\overline{\text{LRCK}}$ is input to IC101 $\overline{\text{CS}}$ and cut off at the 16th bit.

The heart of D/A conversion is PCM53JG-I (IC102, 202), which immediately outputs corresponding analog current when parallel data is input. In other words, parallel data output means D/A conversion start. Parallel data is output at the rising edge of LR18. IC102, 202 output current is sent to the sample & hold circuit.

1-5. APT Circuit (attached to APT PLL)

This system makes the sample & hold APT, $\overline{\text{APT}}$ and conversion start timing LR18 for the D/A converter.

The APT PLL VCO is the VCO block inside the shield case. Oscillation frequency is 256fs when CTRL is low (when fs is 44.1kHz, 48kHz), and 384fs when CTRL is high (fs is 32kHz). This is divided 1/2 (CTRL: Low) or 1/3 (CTRL: High) at IC522, then further divided 1/4, 1/16, 1/32, 1/64 at IC516, to make A32FS, A8FS, A4FS and A2FS. These 4 signals and D latch are combined to get APT, $\overline{\text{APT}}$ and LR18.

The rising time for APT PLL lock is slow, so for about 4 seconds after input signal RX is cut, such as directly after input switching, a signal is received from D FIL PLL to make APT, $\overline{\text{APT}}$ and LR18.

1-6. Control System

Operations normally performed by a microcomputer, such as sampling frequency fs display, fs switching, operation mode switching (muting), etc. are performed on this set by hard logic. The important, representative ones are described below.

I) CTRL

On this set mode is switched by the CTRL signal, because APT PLL oscillation range is narrow, and because with 2FS detection, the mono-stable multivibrator time constant must be switched by fs=32kHz and fs=44.1kHz ~ 48kHz. CTRL = low corresponds to fs=44.1kHz ~ 48kHz, and CTRL = high corresponds to fs=32kHz.

CTRL is output by IC525 (J-K-F·F is used as T-F·F), and that input signal is the $\overline{\text{DISCHG}}$ output of DAI decoder IC, CX23053 (IC510). $\overline{\text{DISCHG}}$ is a negative pulse output when the signal can not be read, as when input signal mode is wrong, and the mode switches each time this pulse is output.

II) UNLOCK, MUTH, $\overline{\text{ULD}}$ ($\overline{\text{UNLK}}$), ULLD

UNLOCK is output until correct data is ready when CX23053 (IC510) is unable to read the signal. UNLOCK is output before $\overline{\text{DISCHG}}$.

MUTH is the OR of UNLOCK and the RST immediately after power on, and the lamp is muted when MUTH is high. $\overline{\text{ULD}}$ (same as $\overline{\text{UNLK}}$) is a signal which is about a 3msec delay of MUTH fall, and when this goes low, parallel data is cleared, digital mute results, and audio is also muted.

During the 3msec after UNLOCK goes OFF and before ULD (UNLK) goes high, digital filter refresh (effect of invalid data disappears) is done. ULLD is a signal which is about a 4 second delay of UNLOCK fall, and is for switching the generation source of APT, $\overline{\text{APT}}$ and LR18 from APT PLL to D FIL PLL.

III) $\overline{\text{CS}}$

This is the system reset timing source for CX23053, and is obtained by timer IC NJM555D (IC512).

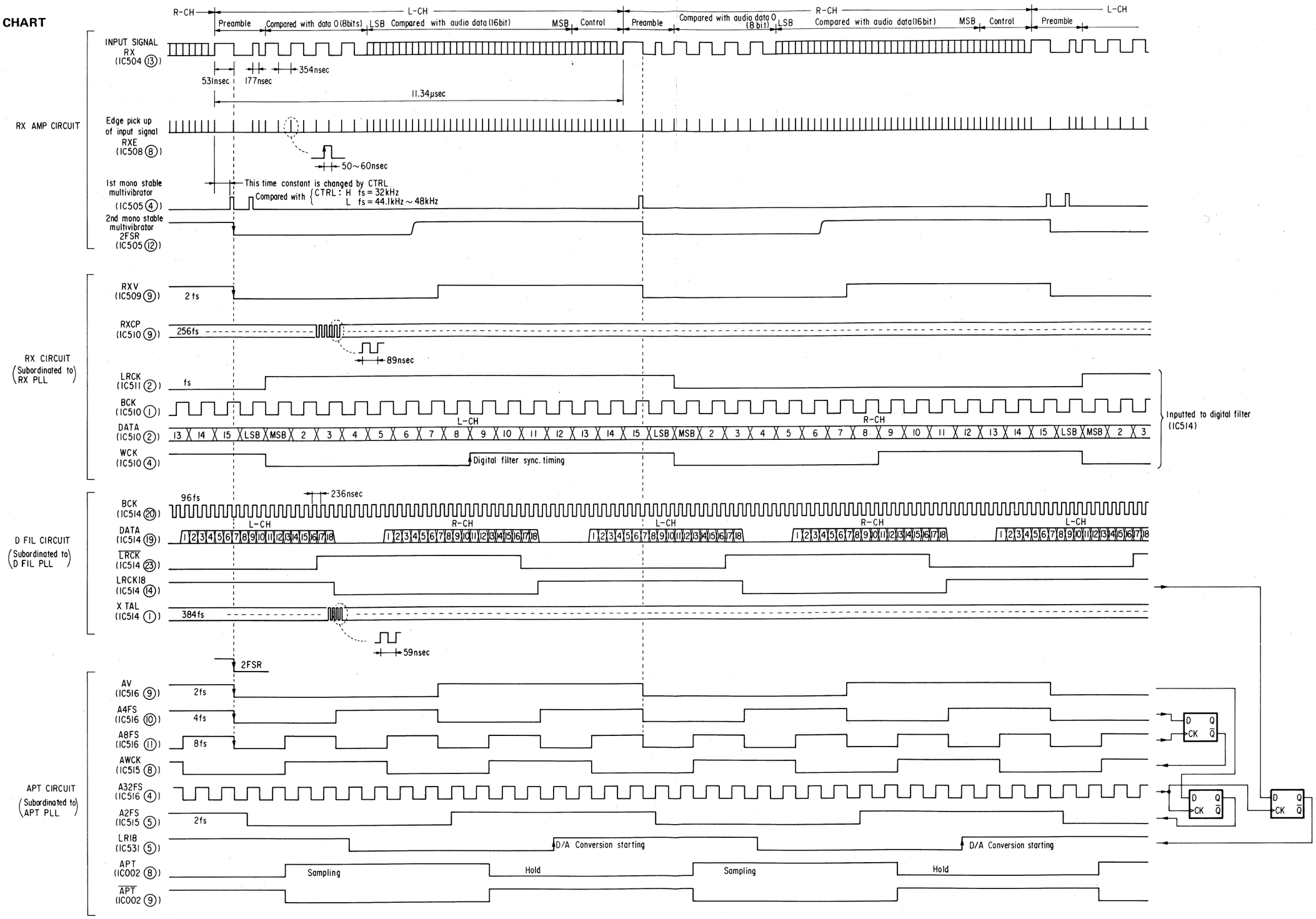
IV) EMPHA, EMP

EMPHA is output from CX23053 (IC510) when emphasis is applied to the digital source. EMP is a 30msec delay of EMPHA.

V) $\overline{\text{4·8}}$

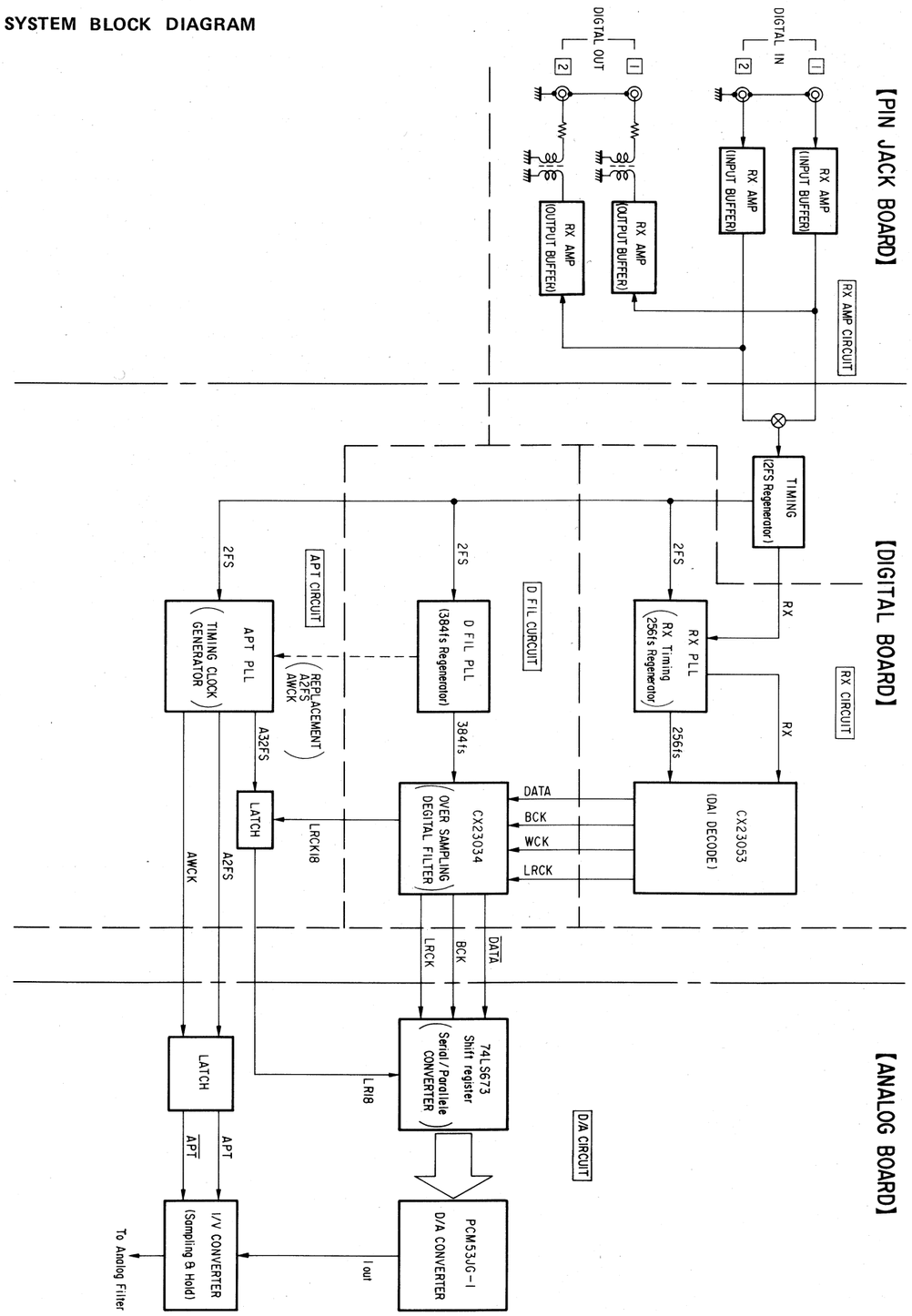
When fs is 44.1kHz ~ 48kHz, this is comparator output which detects which it is, and goes low when fs = 48kHz. Comparison is done by D FIL PLL VCO IC (IC417) VT voltage. VT has a large temperature response, which is compensated by C520 and TH501. Therefore, after using a soldering iron in this area, leave for about 10 minutes, to cool, before adjusting RT501.

TIMING CHART



X axis of this timing chart is compared with Sampling frequency of 44.1kHz

SYSTEM BLOCK DIAGRAM



2. Analog Section

2-1. D/A Converter

fs in this set is multi-sampling use for 32kHz, 44.1kHz and 48kHz, so an integrated type (CX20152, etc.) counter clock is difficult to use. A ladder type (Burr-Brown PCM53JG-I) is used instead. This immediately outputs analog current when parallel data is input. This IC is easy to use, and the effect of other elements on sound quality is greater, so even though the differentiated non-linear error (distortion ratio) is not very good, there is no problem in using this IC.

However, zero cross distortion can easily be corrected, so adjustment possible using RT101 and RT201. They adjust the injection amount before and after MSB data inversion (complement of 2 offset binary conversion) and cancel distortion.

2-2. Sample & Hold Circuit

This is basically the same as that on CDP, etc. D/A converter output current has ±30% variation, so here gain is adjusted and levels are matched.

Resistor value is switched by a dip switch, as variable resistors have an adverse effect on sound quality. The variable range of each switch is as follows.

1: 0.2dB, 2: 0.4dB, 3: 1dB, 4: 2.2dB

With these, LINE OUT (playback of FIXED digital 0dB signal) output is adjusted to 2VRMS (+8.23dB).

2-3. Low Pass Filter

The low pass filter on this model is an active type 7-order low pass filter, based on the LC type and converted to active. This conversion is done by GIC (Generalized Impedance Converter), and with this a passive filter is converted simply to an active type. Compared to a normal active filter using a 0dB buffer, the number of elements is slightly greater, but since most of the audible range components do not pass the op amp, the sound quality is excellent.

2-4. Power Supply Circuit

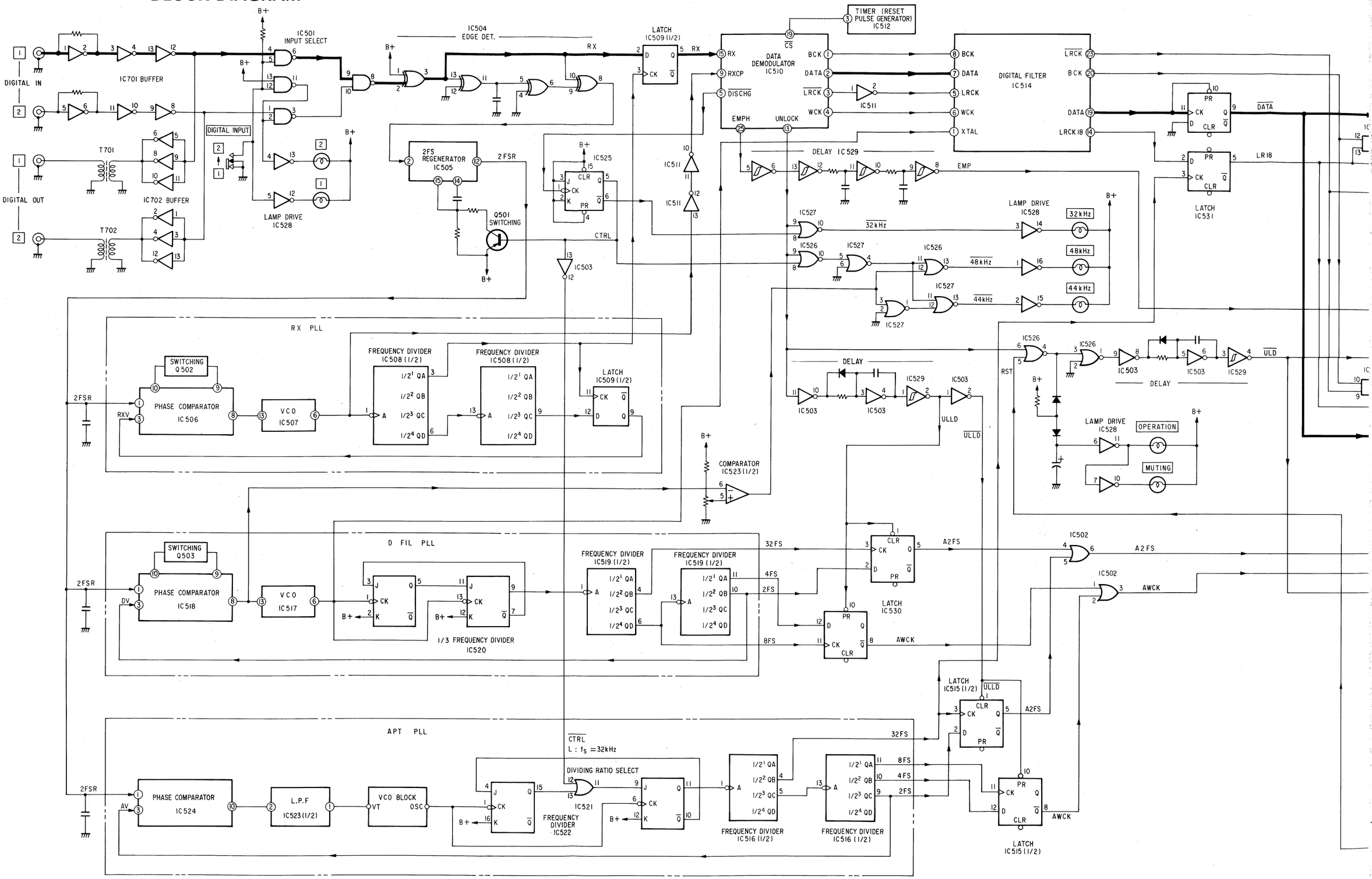
This is not a new circuit. However, there is a danger of breakdown if op amp CX20198 (IC003, 109, 209) goes over 15V, and also if this B line is too low, D/A converter PCM53JG-I (IC102, 202) operation may become unstable, so it is adjusted to ±14.2V ~ 14.6V with an adjustment pattern. Q313 and Q314 form a protector, and shut down the constant current circuit (+ side Q311, 312; - side Q315, 316), turning it off if this B line is shorted, etc. causing voltage to drop too much.

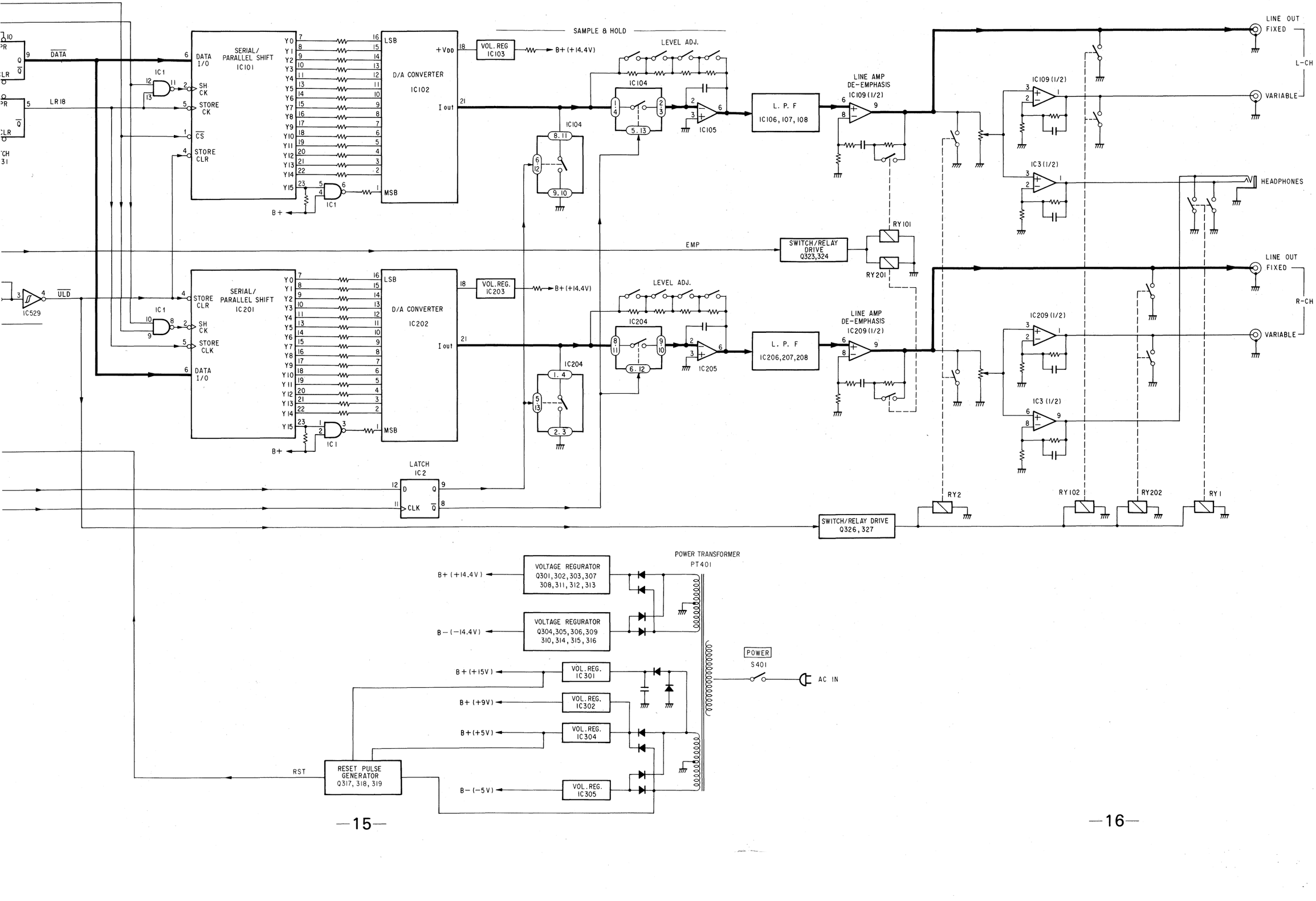
2-5. RES Circuit (Reset for power ON, OFF)

A reset signal, RES, is output from Q317 during the time (about 3 seconds) until Q319 turns on when power is turned on and C339 (100μF) is charged by R337 (100kΩ).

When power is turned off, discharge is by R342, 343 (150Ω series) and the reset signal is output momentarily.

SECTION 2
BLOCK DIAGRAM



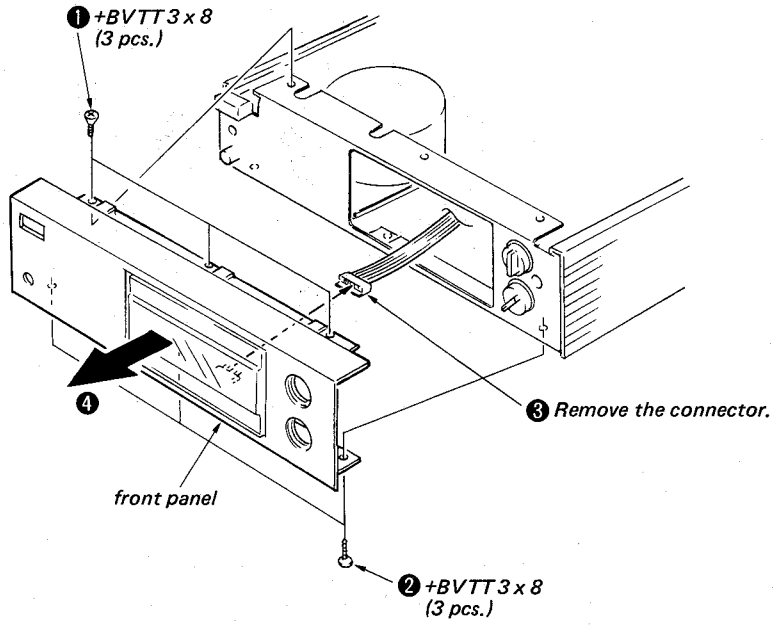

DATA
LR18
ULD
IC529
SERIAL/ PARALLEL SHIFT IC101
SERIAL/ PARALLEL SHIFT IC201
DATA I/O
SH. CK
STORE CK
CS
STORE CLR
STORE CLK
IC1
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
Y10
Y11
Y12
Y13
Y14
Y15
LSB
MSB
B+
D/A CONVERTER IC102
D/A CONVERTER IC202
+VDD
Iout
SAMPLE & HOLD
VOL. REG IC103
VOL. REG. IC203
B+ (+14.4V)
LEVEL ADJ.
IC104
IC204
IC105
IC205
L. P. F IC106, 107, 108
L. P. F IC206,207,208
LINE AMP DE-EMPHASIS IC109 (1/2)
LINE AMP DE-EMPHASIS IC209 (1/2)
IC109 (1/2)
IC209 (1/2)
IC3 (1/2)
LINE OUT FIXED
VARIABLE
L-CH
R-CH
HEADPHONES
EMP
SWITCH/RELAY DRIVE Q323,324
SWITCH/RELAY DRIVE Q326,327
RY101
RY201
RY2
RY102
RY202
RY1
LATCH IC2
D
CLK
Q
RST
RESET PULSE GENERATOR Q317, 318, 319
POWER TRANSFORMER PT401
VOLTAGE REGURATOR Q301,302,303,307 308,311,312,313
VOLTAGE REGURATOR Q304,305,306,309 310,314,315,316
B+ (+14.4V)
B− (−14.4V)
B+ (+15V)
B+ (+9V)
B+ (+5V)
B− (−5V)
VOL. REG. IC301
VOL. REG. IC302
VOL. REG. IC304
VOL. REG. IC305
POWER S401
AC IN

SECTION 3
DISASSEMBLY

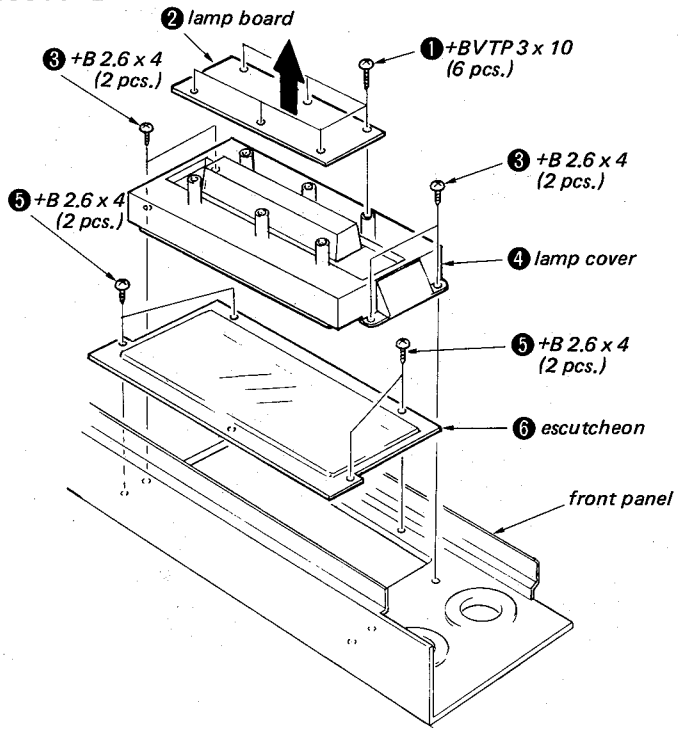
• Follow the disassembly procedure in numerical order given.

Remove the Top plate and Bottom plate.

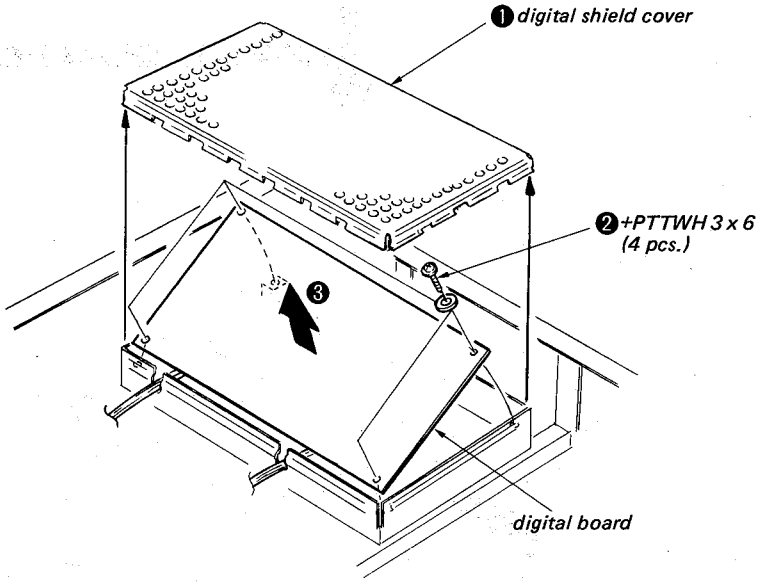
FRONT PANEL



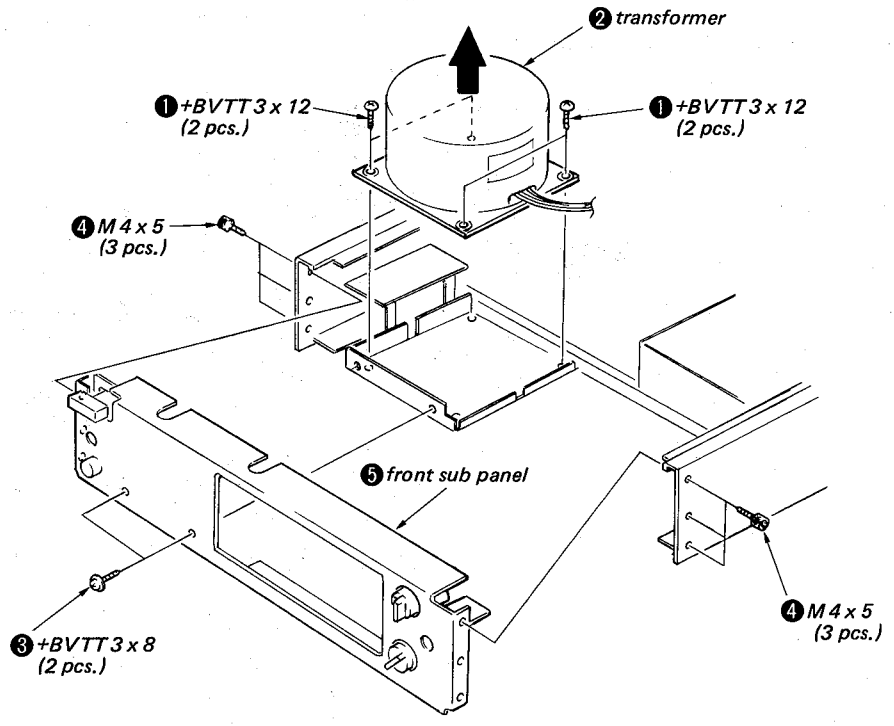
LAMP BOARD, LAMP COVER, ESCUTCHEON



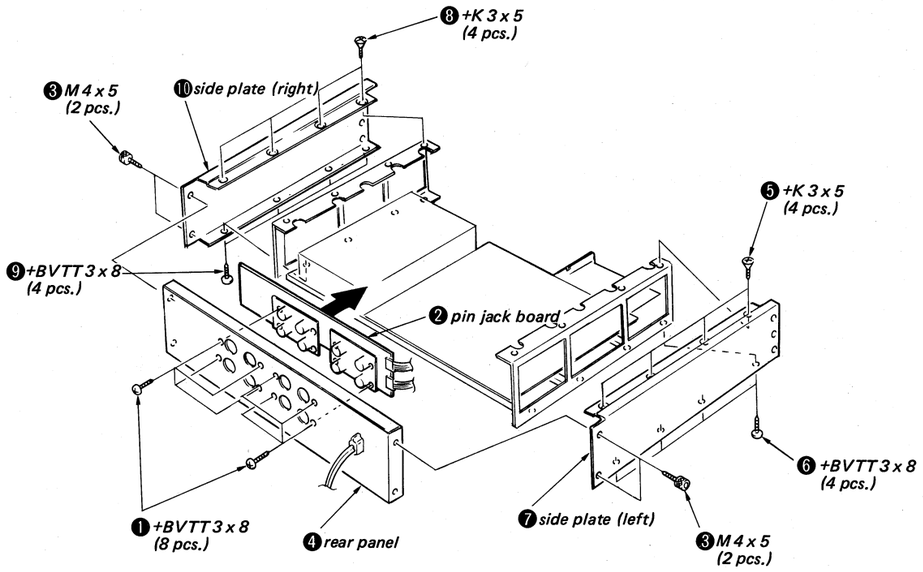
DIGITAL BOARD



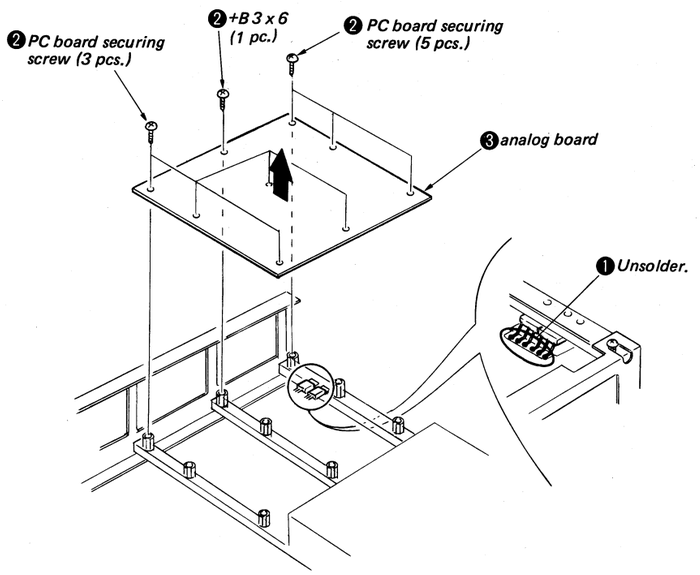
TRANSFORMER FRONT SUB PANEL



SIDE PLATE (L), (R), REAR PANEL


❽ +K 3 x 5 (4 pcs.)
❸ M4 x 5 (2 pcs.)
❿ side plate (right)
❺ +K 3 x 5 (4 pcs.)
❾ +BVTT 3 x 8 (4 pcs.)
❷ pin jack board
❻ +BVTT 3 x 8 (4 pcs.)
❶ +BVTT 3 x 8 (8 pcs.)
❹ rear panel
❼ side plate (left)
❸ M4 x 5 (2 pcs.)

ANALOG BOARD

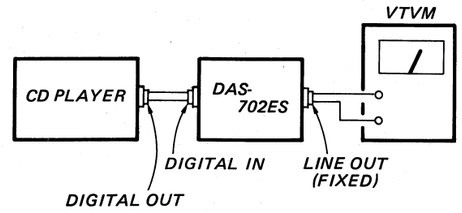


SECTION 4
ADJUSTMENTS

- The adjustments are required CD player having digital output followed to the DAI format (ex. CDP-552ESD or CDP-650ESD)
- Wait for 10 minutes after power switch is turned ON to avoid drift due to temperature rising.

Level Adjustment

Procedure:

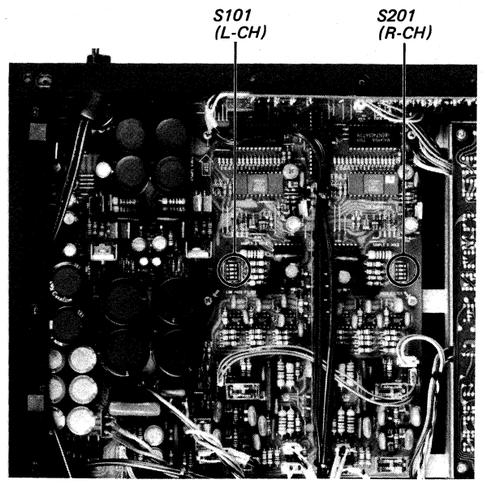


1. Play back the TNO (1) (1kHz, 0dB) signal of test disc YEDS-7.
2. Adjust the dip switch S101 (L-ch), S201 (R-ch) so that line out level is 2V ± 0.05V (8.23dB ± 0.2dB).

Variable range of dip switch

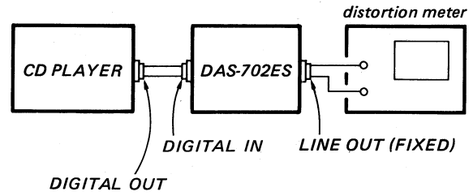
S101, 201-1 (1-5)	0.2dB
-2 (2-6)	0.4dB
-3 (3-7)	1dB
-4 (4-8)	2.2dB

Adjustment Location: analog board



Distortion Adjustment

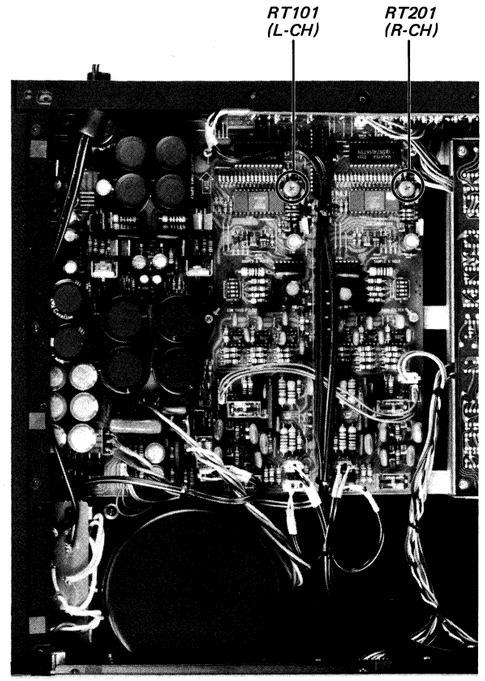
Procedure:



1. Play back the TNO (4) (100Hz, 0dB) signal of test disc YEDS-7.
2. Adjust RT101 (L-ch), RT201 (R-ch) for minimum reading on the distortion meter.

   Specifications: Less than 0.004%

Adjustment Location: analog board

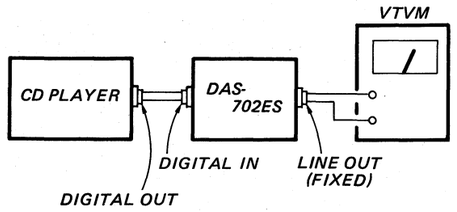


SECTION 4
ADJUSTMENTS

- The adjustments are required CD player having digital output followed to the DAI format (ex. CDP-552ESD or CDP-650ESD)
- Wait for 10 minutes after power switch is turned ON to avoid drift due to temperature rising.

Level Adjustment

Procedure:

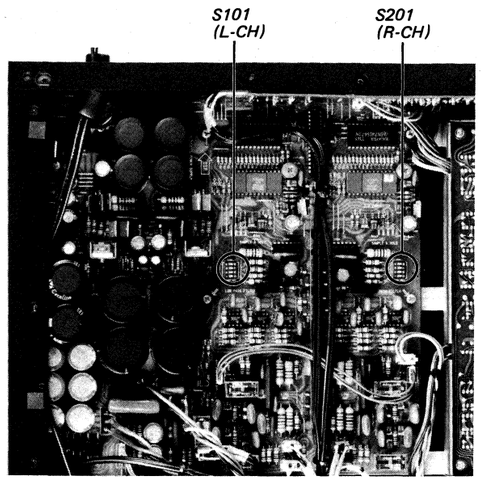


1. Play back the TNO (1) (1kHz, 0dB) signal of test disc YEDS-7.
2. Adjust the dip switch S101 (L-ch), S201 (R-ch) so that line out level is 2V ± 0.05V (8.23dB ± 0.2dB).

Variable range of dip switch

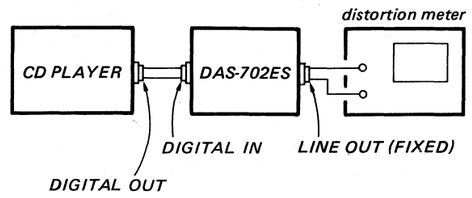
S101, 201-1 (1-5)	0.2dB
-2 (2-6)	0.4dB
-3 (3-7)	1dB
-4 (4-8)	2.2dB

Adjustment Location: analog board



Distortion Adjustment

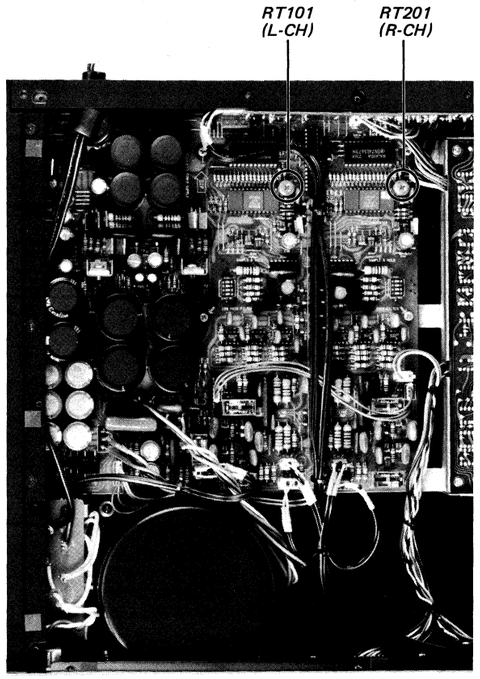
Procedure:



1. Play back the TNO (4) (100Hz, 0dB) signal of test disc YEDS-7.
2. Adjust RT101 (L-ch), RT201 (R-ch) for minimum reading on the distortion meter.

   Specifications: Less than 0.004%

Adjustment Location: analog board



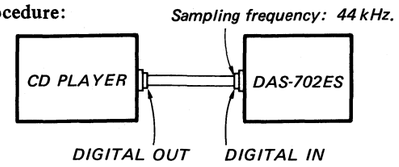
FS (Sampling frequency) Lamp Adjustment

This set automatically perceives the sampling frequency of digital signal applied. The sampling frequency, 44kHz or 48kHz, is checked by comparator (IC523) that compares the voltage applied to VCO of D FIL PLL with the reference voltage.

The FS lamp adjustment is made to adjust this reference voltage.

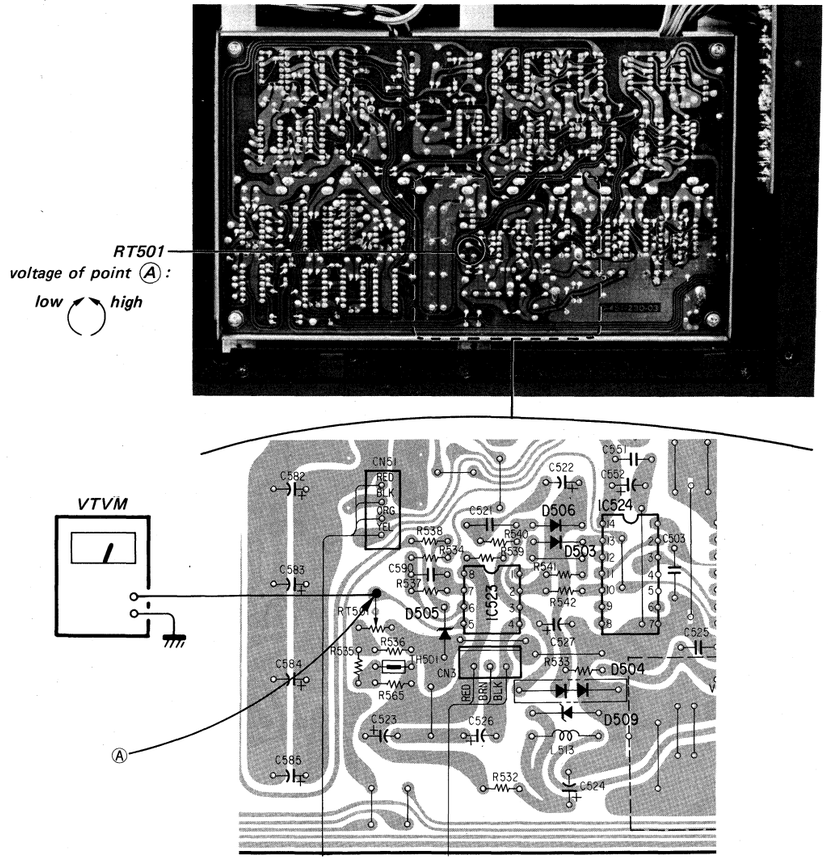
Note: Wait for about 10 minutes when TH501 and C520 that are employed for thermal compensation are warmed by soldering iron.

Procedure:



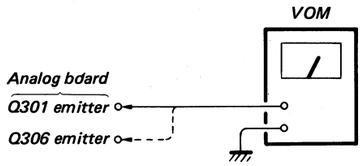
1. Play back any compact disc, receive the digital signal of sampling frequency 44kHz.
2. Make sure that 44kHz sampling frequency indicator lamp goes ON.
3. Adjust RT501 so that all sampling frequencies indicators go off and in this time check the voltage of point Ⓐ is 0.1V higher than voltage measured in step 3.

Adjustment Location: digital board



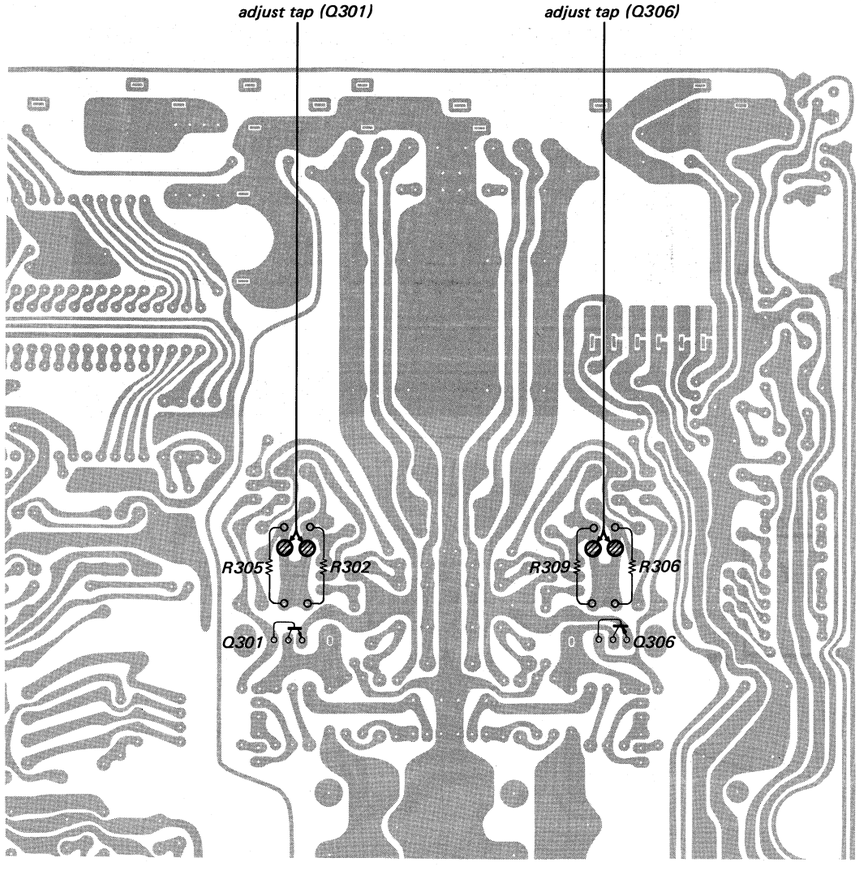
Voltage Adjustment

Procedure:



1. Change the tap so that emitter voltage of Q301 becomes 14.4 ± 0.2V.
2. Change the tap so that emitter voltage of Q306 -14.4 ± 0.2V.

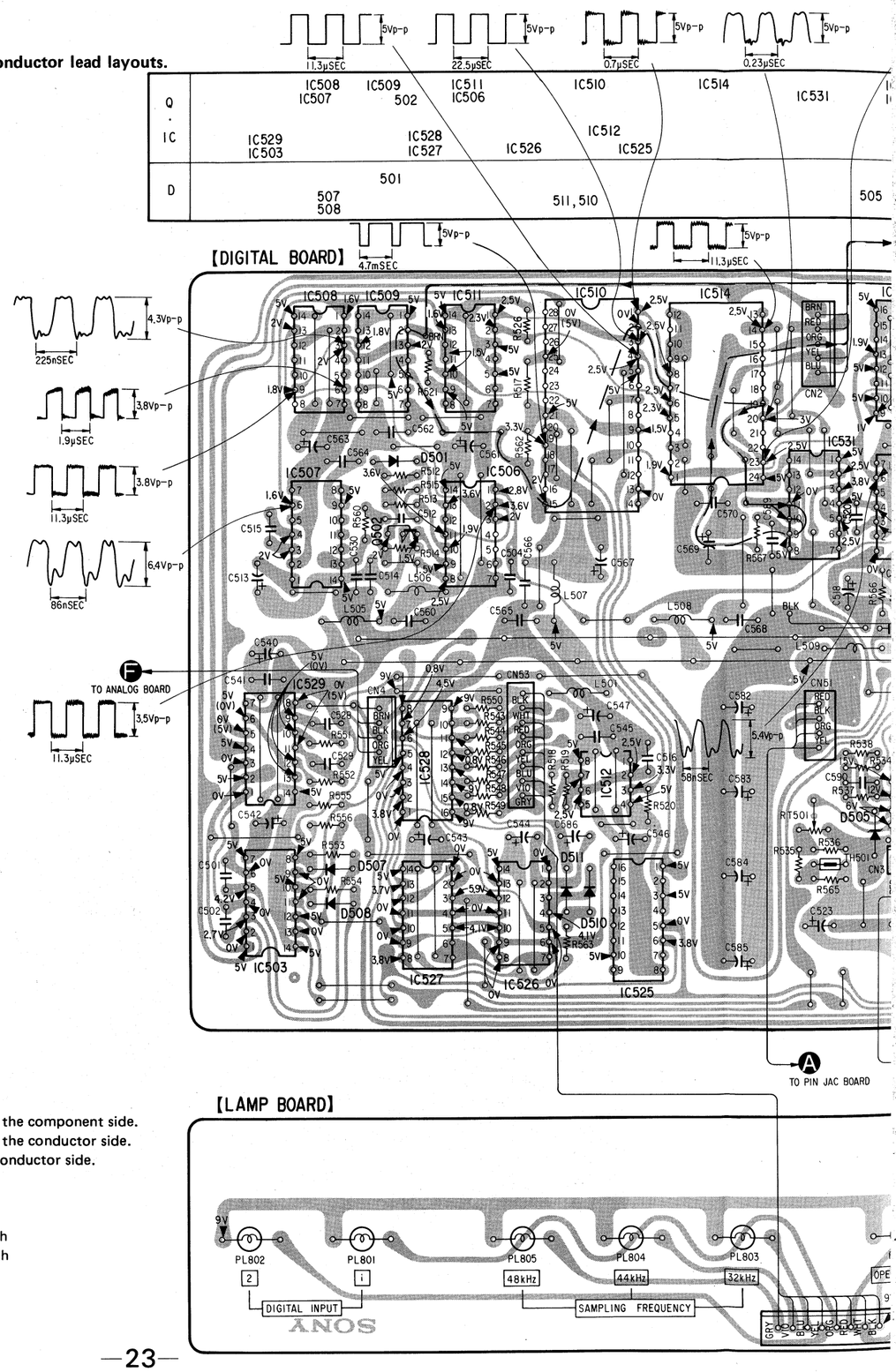
Adjustment Location: analog board



5-1. MOUNTING DIAGRAM

– Digital Section –

● See page 29 for semiconductor lead layouts.



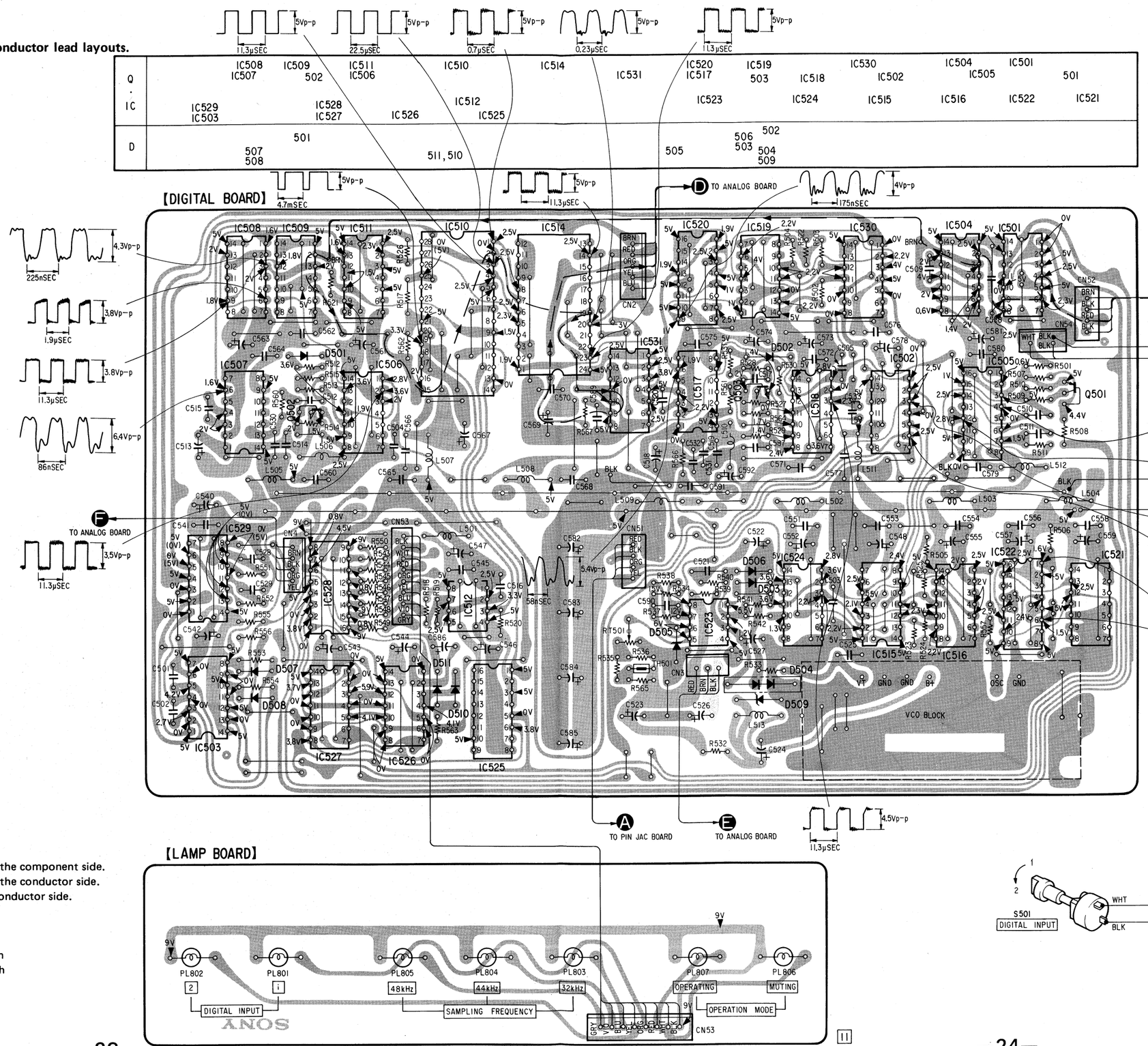
Note:

- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mountéd on the conductor side.
- : B+ pattern
- : B- pattern
- : signal path
- : L-CH signal path
- : R-CH signal path

5-1. MOUNTING DIAGRAM

– Digital Section –

● See page 29 for semiconductor lead layouts.



Note:

- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- : B+ pattern
- : B– pattern
- : signal path
- : L-CH signal path
- : R-CH signal path

5-2. SCHEMATIC DIAGRAM

– Digital Section –

【PIN JACK BOARD(1/3)】

【DIGITAL BOARD】

IC701 TC74HCU04 INPUT BUFFER

IC702 TC74HCU04P OUTPUT BUFFER

IC501 TC74HC00P INPUT SELECT

IC504 SN74LS86N EDGE DET

IC505 SN74LS123N 2FS PRODUCE (MONOSTABLE MULTIVIBRATOR)

IC506 MC4044P RX PLL PHASE COMPARATOR

IC507 SN74LS624N RX PLL VCO

IC508 SN74LS393N FREQUENCY DIVIDER

IC509 SN74LS74AN LATCH

IC510 CX23053 DATA DEMODULATOR

IC511 SN74LS04N INVERTER

IC512 NJM555D TIMER

IC518 M4044P DFIL PLL PHASE COMPARATOR

IC517 SN74LS624N DFIL PLL VCO

IC520 SN74LS112AN FREQUENCY DIVIDER

IC519 SN74LS393N FREQUENCY DIVIDER

IC523 TL072ACP LOWPASS FILTER

IC524 MC4044P APT PLL PHASE COMPARATOR

IC521 TC74HC32P DIVIDING RATIO SELECT

IC522 TC74HC76P FREQUENCY DIVIDER

IC516 SN74LS393N FREQUENCY DIVIDER

IC515 TC74HC74P LATCH

IC530 TC74HC74P LATCH

IC503 TC74HCU04P INVERTER

IC525 SN74LS112AN FREQUENCY DIVIDER

IC502 TC74HC32P SIGNAL SELECT

Q501 2SA1048 SWITCHING

Q502 2SC2458 SWITCHING

Q503 2SC2458 SWITCHING

D501 ISS97

D502 ISS97

D503 ISS97

D504 SV-02

D506 IS953-7

D508 IS953-7

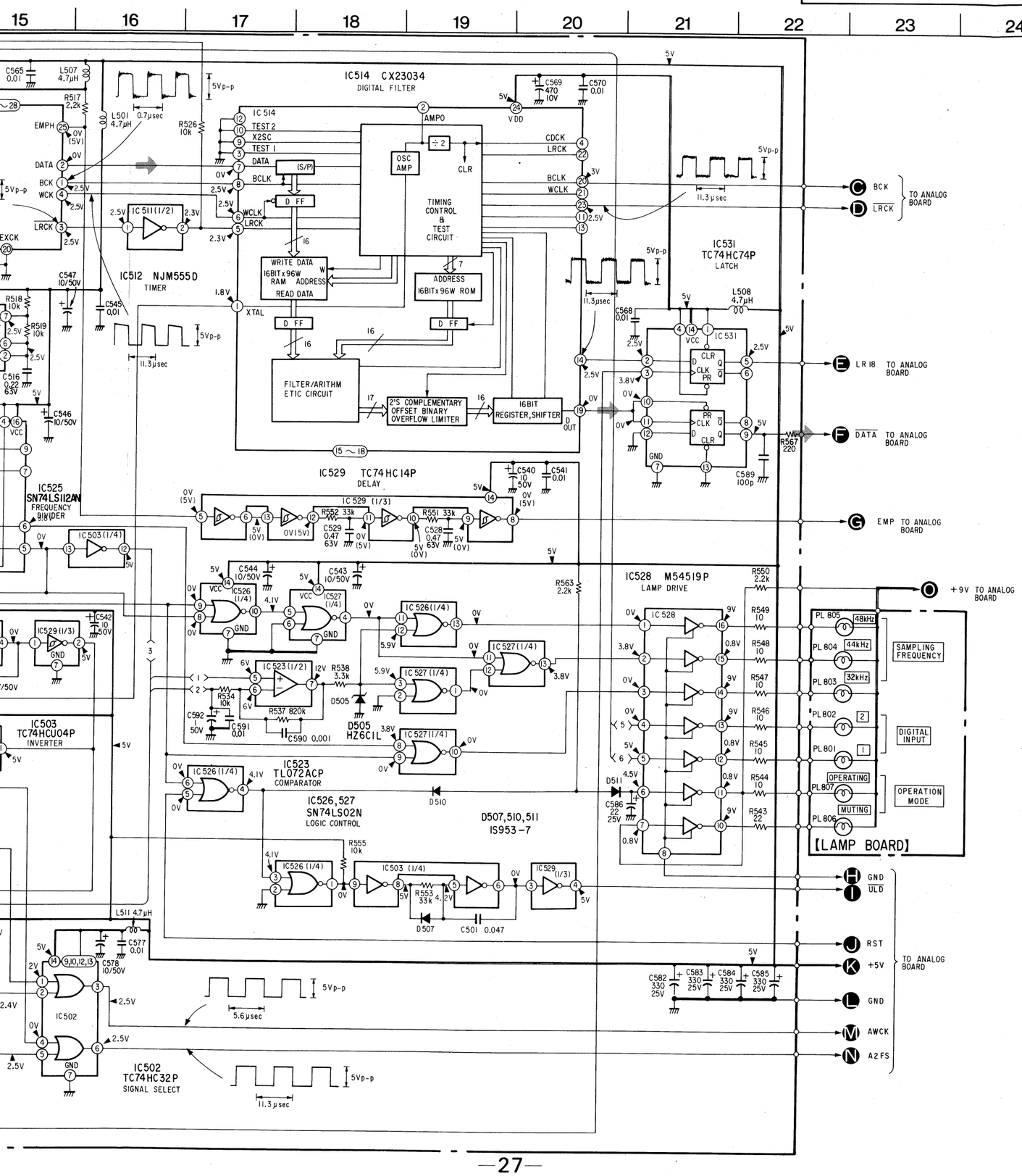
D509 RDIOE-B2

DIGITAL IN

DIGITAL OUT

TO ANALOG BOARD A +15V

TO ANALOG BOARD B -5V



Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- ➡ : signal path.
- ▬ : B+ bus.
- ▬ ▬ : B- bus.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with VOM (50 kΩ/V).
  ( ): When regenerated with emphasis applied to the disc.
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in playback mode by using oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Switches

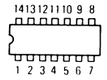
Ref. No.	Switch	Position
S501	DIGITAL INPUT	1

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

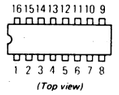
• Semiconductor Lead Layouts

NE5532P
NJM555D
TL072CP
SN74LS02N

TC74HC00P
TC74HC74P
TC4066BP
TC74HC32P
TC74HCU04P
SN74LS86N
MC4044P
SN74LS624N
SN74LS393N
SN74LS74N
SN74LS04N
TC74HC14P

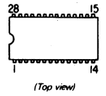


SN74LS123N
SN74LS112AN
MC74HC76N
M54519P

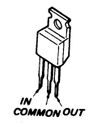


SN74LS673
PCM53JG-1
CX23034

CX23053



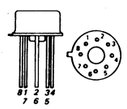
μPC78M15H



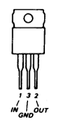
CX20198

(Marking side view)

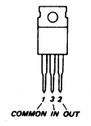
LF356H



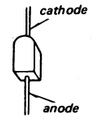
NJM7809A
NJM78M20A
μPC7805H



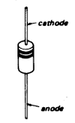
NJM79M05A



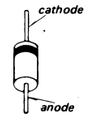
SV-02



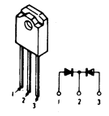
21DQ05
EQB01-07



RD2.7E-B2
10YD4.5A
HZ5CLL
10YD1.3A
EQB01-07
31DQ05
1S953-7
10DF1
1SS97
HZ6C1L
RD10E-B2



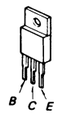
C16P20F
C16P20FR



2SB646A
2SD666A

DTC124ES
2SA1048-GR

2SC2275-P
2SA1383
2SC3514
2SA985-P

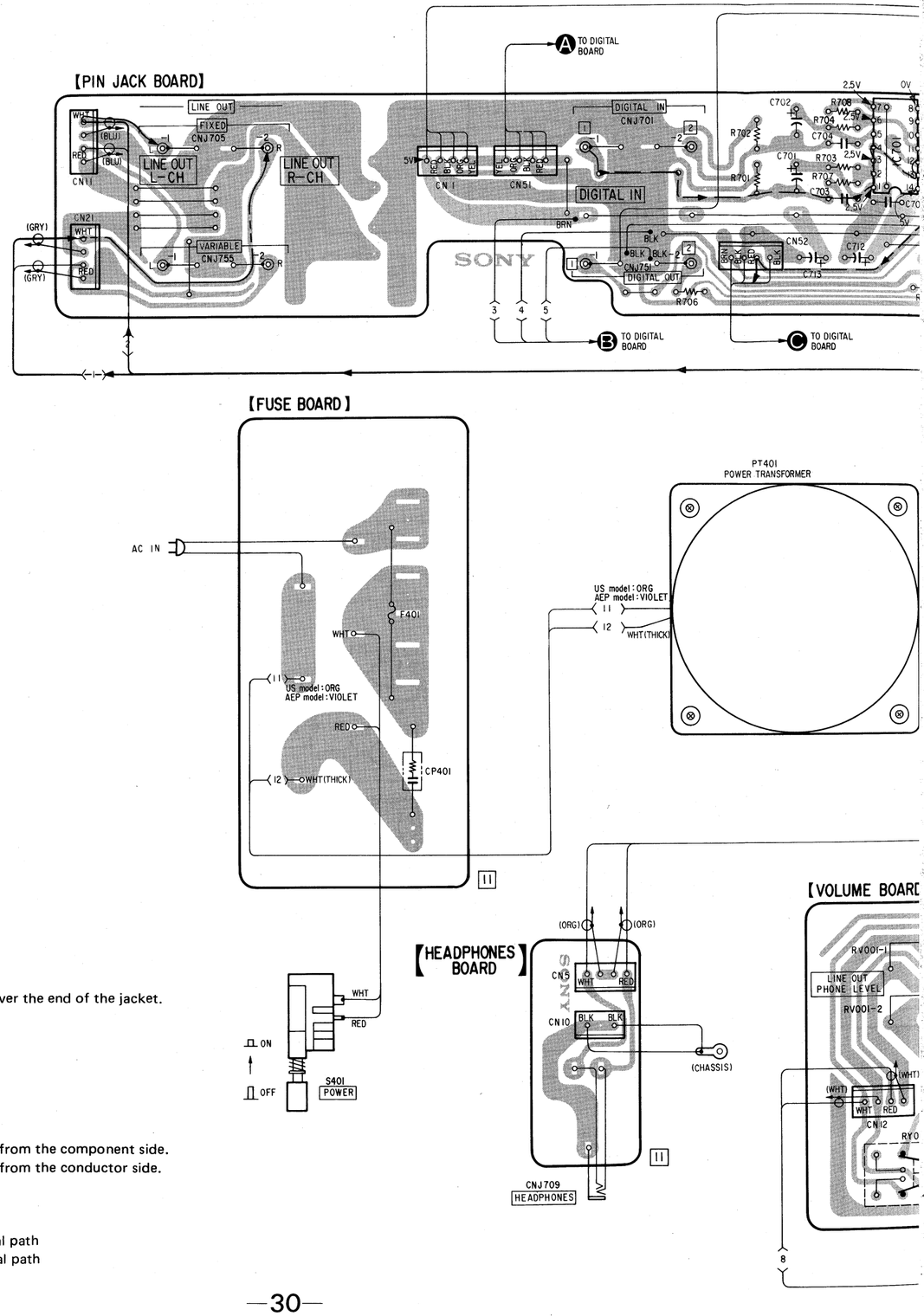


2SB734

2SC2785-E

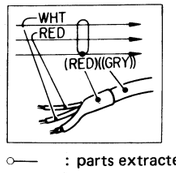
5-3. MOUNTING DIAGRAM

– Analog Section –



Note:

- Color code of sleeving over the end of the jacket.



- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ▒ : B+ pattern

- ▬▶▬ : signal path
- ▬▶ : L-CH signal path
- ▬▶ : R-CH signal path

【ANALOG BOARD】

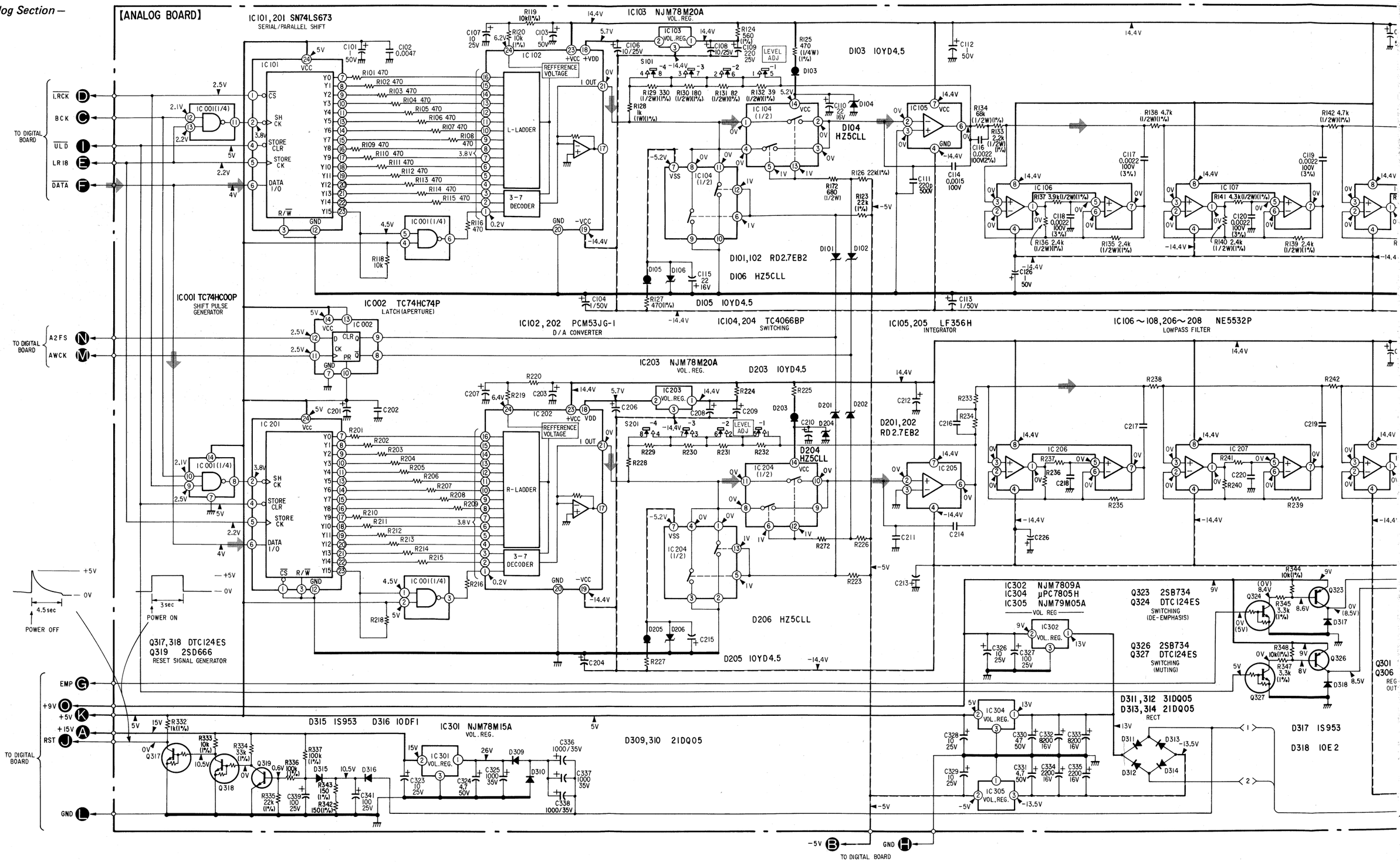
【VOLUME BOARD】

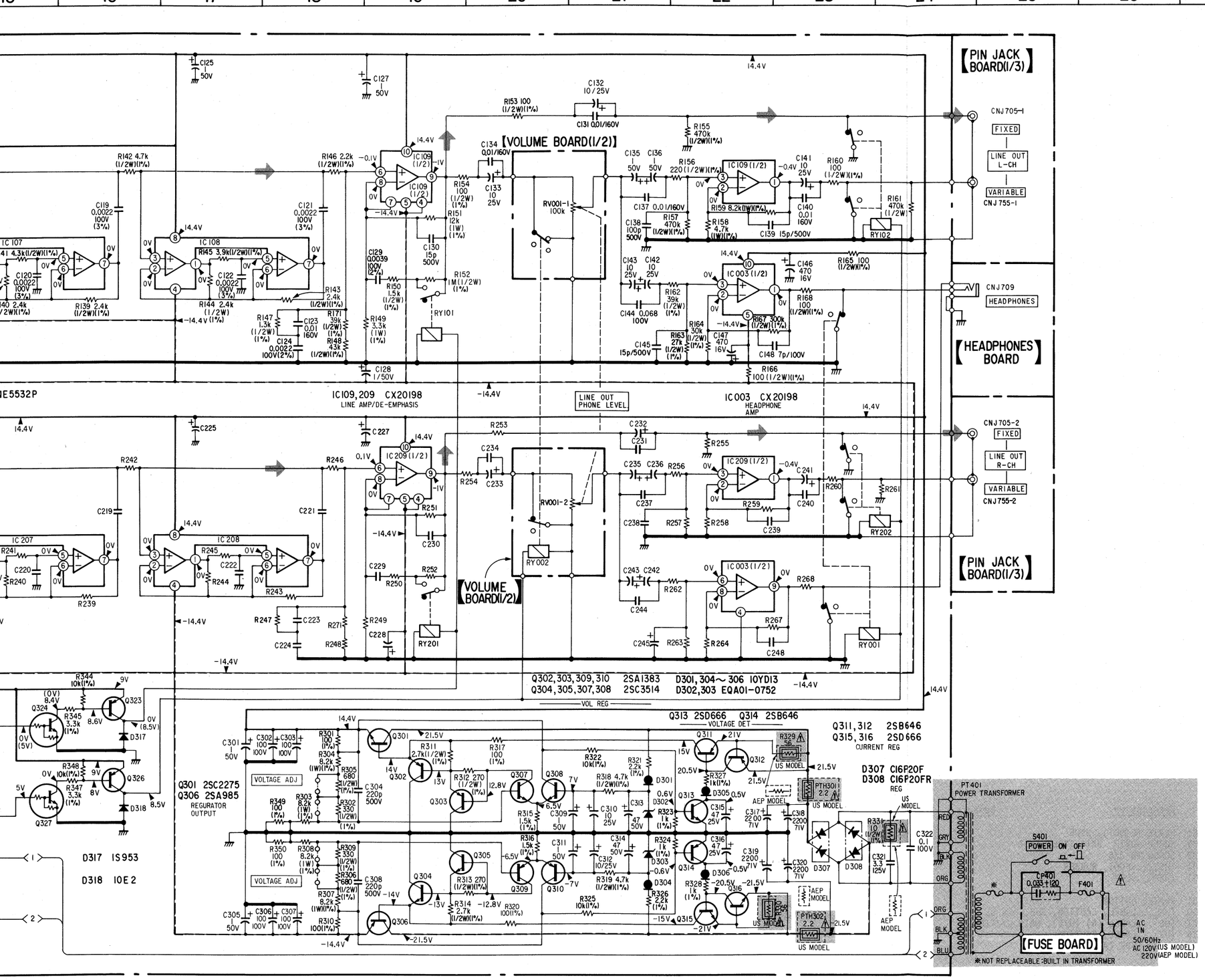
PT401
POWER TRANSFORMER

Q , IC	D
IC701,IC702 IC001	
IC201,IC101	
IC305,IC301 IC002 IC302,IC304	
IC202,IC102	201,202 102,101
302,303, 305,304 IC203,IC103	316
	315 204,203,206 205
319	103,104,105 106
307,308,310,309,318 317	
301,306 IC204,IC104	302,303
312,316	
IC205,IC105 311,313,314 315	305,301 304,306
IC208,IC207,IC206 IC106,IC107,IC108	
323,324	317
326,327 IC209,IC109	307,308
IC003	314,313,310 309 312,311 318

5-4. SCHEMATIC DIAGRAM

– Analog Section –





Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- ➡ : signal path.
- ▬▬ : B+ bus.
- ▬ ▬ : B- bus.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with VOM (50kΩ/V).
  ( ): When regenerated with emphasis applied to the disc.
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in playback mode by using oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Switches

Ref. No.	Switch	Position
S401	POWER	OFF

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

DAS-702ES

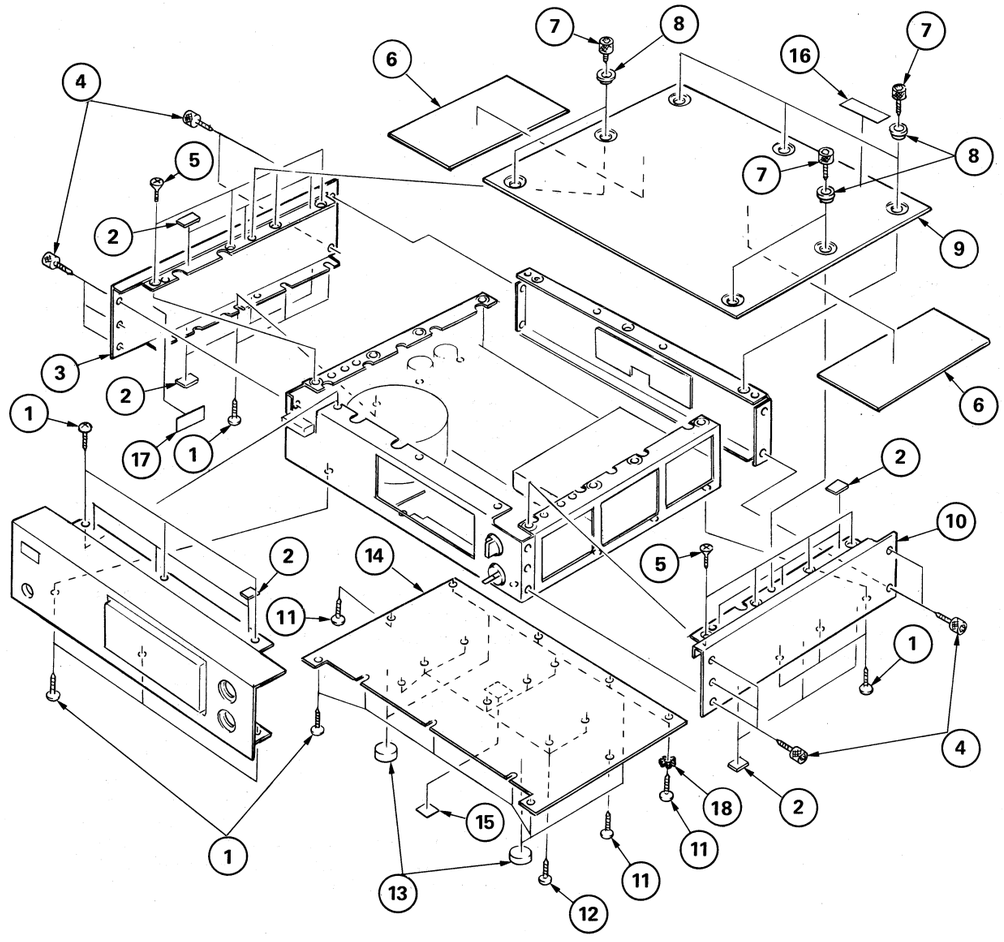
SECTION 6
EXPLODED VIEWS AND PARTS LIST

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

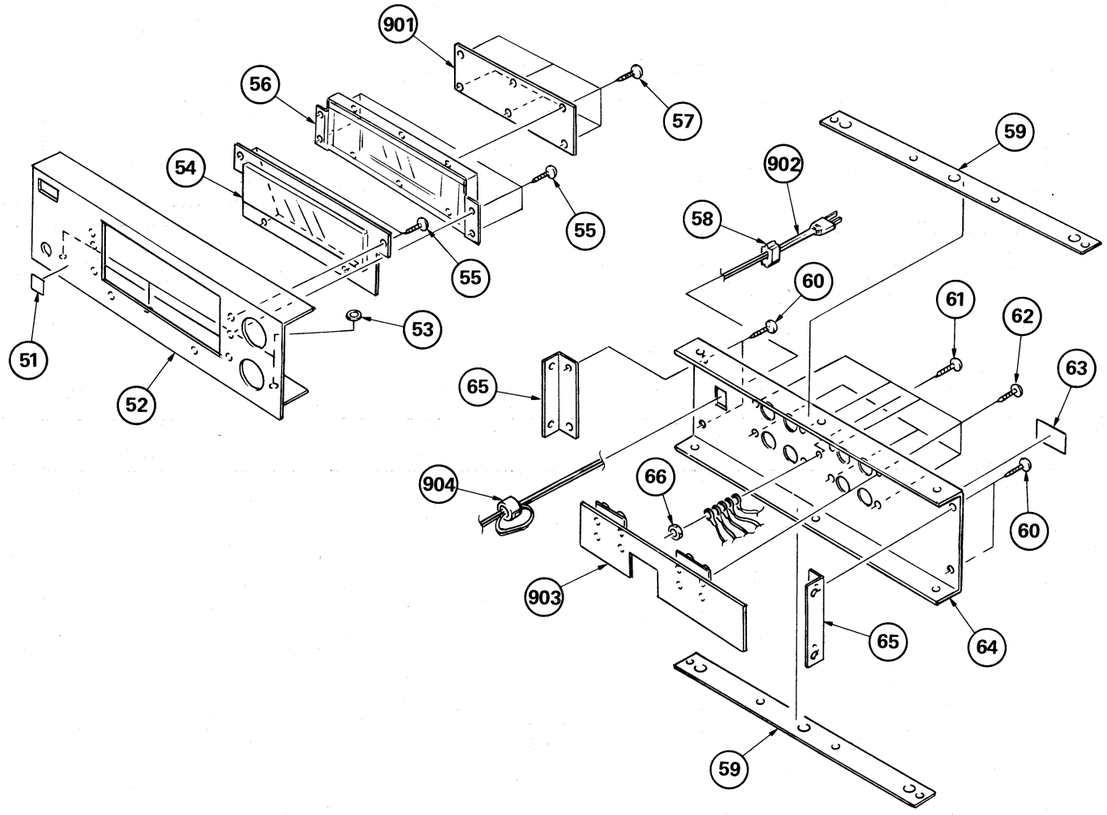
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(1)



No.	Part No.	Description	Remarks
1	3-703-685-21	SCREW (+BV 3X8)	
2	9-911-840-XX	CUSHION	
3	4-909-132-01	PLATE (LEFT), SIDE	
4	7-683-417-04	BOLT, HEXAGON SOCKET 4X5	
5	7-682-246-09	SCREW +K 3X5	
6	9-910-999-34	DAMPER	
7	7-683-402-04	BOLT, HEXAGON SOCKET 3X5	
8	4-909-105-01	ESCUTCHEON, TOP PLATE	
9	4-909-129-01	PLATE, TOP	
10	4-909-131-01	PLATE (RIGHT), SIDE	
11	7-685-649-29	SCREW +BVTP 3X14 TYPE2 SLIT	
12	7-682-547-09	SCREW +B 3X6	
13	*4-909-145-01	(US)....FOOT, RUBBER	
	*4-909-115-01	(AEP)...LEG	
14	*4-909-134-01	PLATE, BOTTOM	
15	*3-703-680-00	(US)...LABEL, CAUTION, SUB, NEW UL	
16	*3-703-845-01	(US)...LABEL (N) (U/C), MAIN CAUTION	
17	*3-703-044-26	(US)...LABEL, CAUTION	
18	7-623-308-07	LW 3, TYPE (A)	

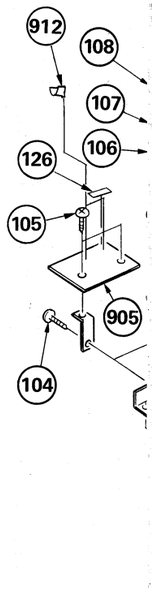
(2)



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

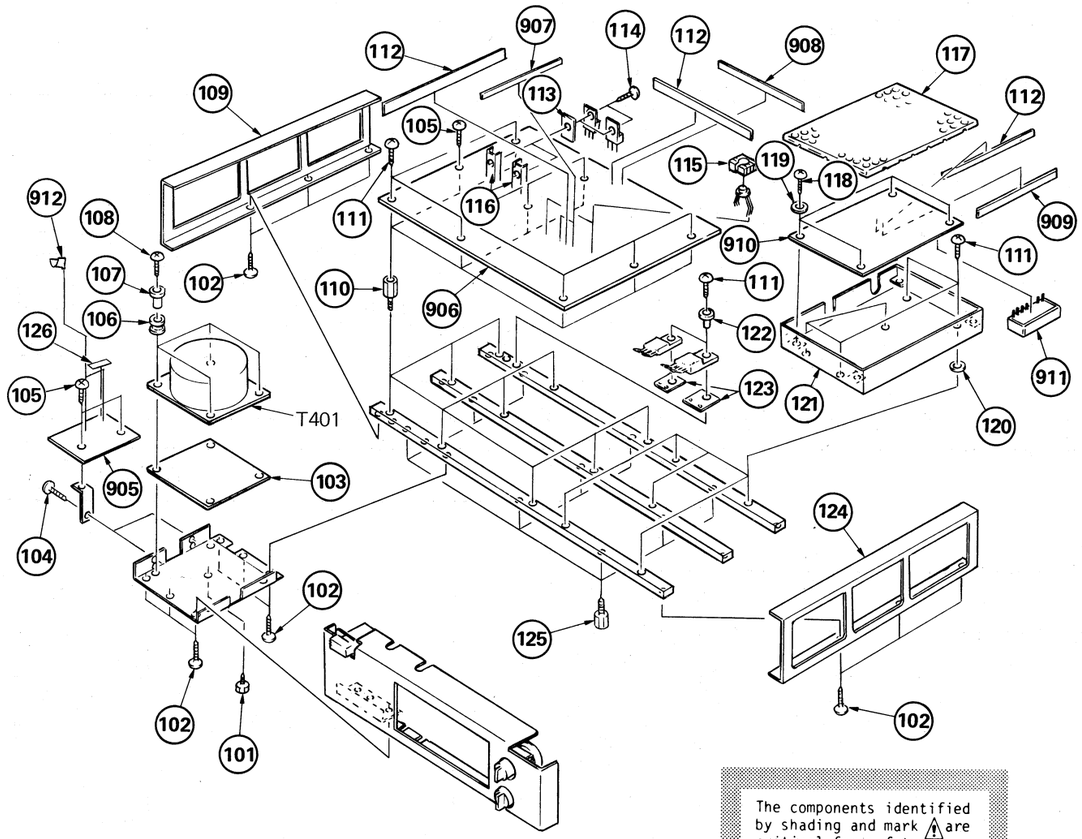
No.	Part No.	Description	Remarks
51	3-703-710-41	STICKER, SONY SYMBOL (12)	
52	X-4909-104-1	FRONT PANEL ASSY	
53	2-045-013-21	WASHER, PANEL (DIA.4)	
54	X-4909-102-1	ESCUTCHEON ASSY	
55	7-621-773-86	SCREW +B 2.6X4	
56	X-4909-103-1	LAMP COVER ASSY	
57	7-685-647-14	SCREW +BVTP 3X10 TYPE2 N-S	
58	3-703-244-00	BUSHING (2104), CORD	
59	*4-909-119-01	SPACER, J PLATE	
60	7-682-561-09	SCREW +B 4X8	
61	7-682-549-09	SCREW +B 3X10	
62	3-703-685-21	SCREW (+BV 3X8)	
63	*4-909-139-01	(US)....LABEL, MODEL NUMBER	
	4-909-141-02	(AEP)...LABEL, MODEL NUMBER	
64	4-909-127-01	PANEL, REAR	
65	*4-909-118-01	ANGLE, REAR PANEL	
66	7-684-023-04	N 3, TYPE 2	
901	*1-614-754-11	PC BOARD, LAMP	
902	⚠ 1-555-701-00	(US)....CORD, POWER	
	⚠ 1-555-795-00	(AEP)...CORD, POWER	
903	*1-614-750-11	PC BOARD, PIN JACK	
904	1-543-140-00	CORE, RING	

(3)



No.	Part No.
101	*4-909-11
102	3-703-68
103	*4-909-1(
104	7-685-87
105	7-682-54
106	*4-888-79
107	*4-909-1(
108	7-685-87
109	*4-882-11
110	*4-870-2(
111	2-259-12
112	*3-311-61
113	4-870-27
114	2-259-12
115	2-269-79
116	*4-886-55
117	*4-906-0(
118	7-685-87
119	4-908-96
120	4-308-03

(3)

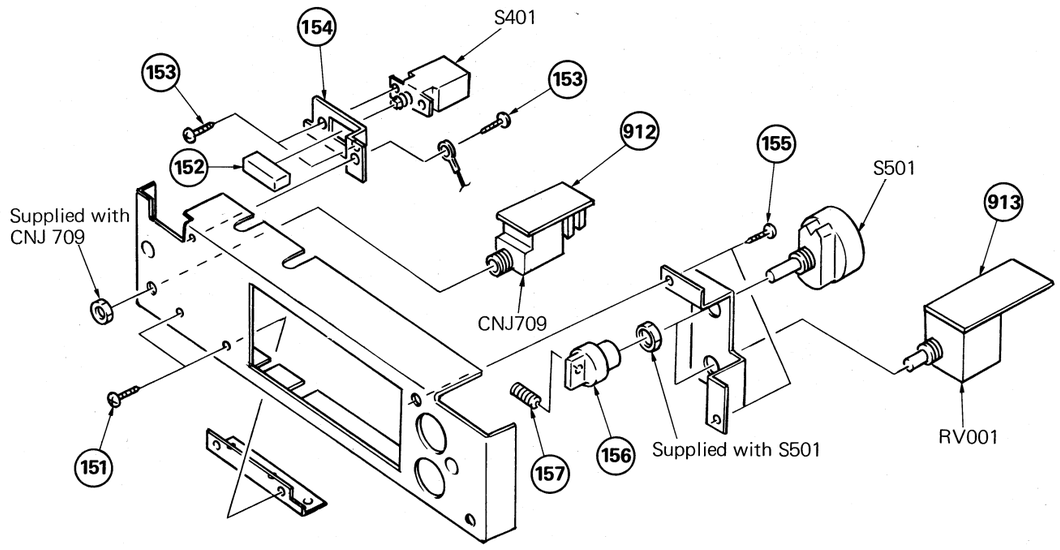


The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remarks
101	*4-909-113-11	STUD, SUPPORT, REINFORCEMENT BAR	
102	3-703-685-21	SCREW (+BV 3X8)	
103	*4-909-109-01	SHEET, TRANSFORMER UNDER	
104	7-685-870-01	SCREW +BVTT 3X5 (S)	
105	7-682-547-09	SCREW +B 3X6	
106	*4-888-798-00	BUSHING, RUBBER	
107	*4-909-108-01	COLLAR	
108	7-685-874-01	SCREW +BVTT 3X12 (S)	
109	*4-882-118-11	PLATE (M), SIDE	
110	*4-870-206-00	SUPPORT, PC BOARD	
111	2-259-121-00	SCREW, TR	
112	*3-311-617-01	REINFORCEMENT, PCB	
113	4-870-272-00	HEAT SINK	
114	2-259-121-00	SCREW, TR	
115	2-269-798-01	HEAT SINK, TO-39	
116	*4-886-555-00	HEAT SINK	
117	*4-906-003-01	COVER, DIGITAL SHIELD	
118	7-685-873-01	SCREW +BVTT 3X10 (S)	
119	4-908-961-01	WASHER	
120	4-308-030-00	WASHER	

No.	Part No.	Description	Remarks
121	*4-906-013-01	CASE, SHIELD, DIGITAL	
122	2-371-561-00	BUSHING (P), INSULATING	
123	3-703-037-00	INSULATOR, TO-220	
124	*4-882-118-00	PLATE (M), SIDE	
125	*4-909-113-01	STUD, SUPPORT, REINFORCEMENT BAR	
126	*3-701-946-23	(US)....LABEL, FUSE	
	3-701-948-14	(AEP)...LABEL, FUSE	
905	*1-614-752-11	PC BOARD, FUSE	
906	*A-4385-217-A	(US)....MOUNTED PCB, ANALOG	
	*A-4385-195-A	(AEP)...MOUNTED PCB, ANALOG	
907	*1-560-242-81	BUS BAR 8P	
908	*1-564-393-00	BUS BAR 9P	
909	*1-560-242-91	BUS BAR 10P	
910	*A-4382-174-A	MOUNTED PCB, DIGITAL	
911	*A-4348-010-A	MOUNTED PCB, VCO	
912	*1-533-131-00	(AEP)...HOLDER, FUSE	
T401 ⚠	1-448-206-11	(US)....TRANSFORMER, POWER	
T401 ⚠	1-448-217-11	(AEP)...TRANSFORMER, POWER	

(4)



No.	Part No.	Description	Remarks
151	3-703-685-21	SCREW (+BV 3X8)	
152	X-4881-408-3	KNOB ASSY, POWER	
153	7-685-870-01	SCREW +BVTT 3X5 (S)	
154	*4-909-107-01	BRACKET, POWER SWITCH	
155	7-682-546-04	SCREW +B 3X5	

No.	Part No.	Description	Remarks
156	4-909-114-01	KNOB, CONTROL	
157	7-683-237-01	SET-SCT, HEX. 3X3 FLAT POINT	
912	*1-614-751-11	PC BOARD, HEADPHONE	
913	*1-614-753-11	PC BOARD, VOLUME	
CNJ709	1-507-796-21	JACK (HEADPHONES)	

SECTION 7
ELECTRICAL PARTS LIST

NOTE:
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuitsin a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
901	*1-614-754-11	PC BOARD, LAMP			
902	⚠1-555-701-00	(US)....CORD, POWER			
	⚠1-555-795-00	(AEP)...CORD, POWER			
903	*1-614-750-11	PC BOARD, PIN JACK			
904	1-543-140-00	CORE, RING			
905	*1-614-752-11	PC BOARD, FUSE			
906	*A-4385-217-A	(US)....MOUNTED PCB, ANALOG			
	*A-4385-195-A	(AEP)...MOUNTED PCB, ANALOG			
907	*1-560-242-81	BUS BAR 8P			
908	*1-564-393-00	BUS BAR 9P			
909	*1-560-242-91	BUS BAR 10P			
910	*A-4382-174-A	MOUNTED PCB, DIGITAL			
911	*A-4348-010-A	MOUNTED PCB, VCO			
912	*1-614-751-11	PC BOARD, HEADPHONE			
913	*1-614-753-11	PC BOARD, VOLUME			
C101	1-131-450-00	TANTALUM	1MF	20%	50V
C102	1-101-003-00	CERAMIC	0.0047MF		50V
C103	1-131-450-00	TANTALUM	1MF	20%	50V
C104	1-131-450-00	TANTALUM	1MF	20%	50V
C106	1-131-522-00	TANTALUM	10MF	20%	25V
C107	1-131-522-00	TANTALUM	10MF	20%	25V
C108	1-131-522-00	TANTALUM	10MF	20%	25V
C109	1-123-334-00	ELECT	220MF	20%	25V
C110	1-131-520-00	TANTALUM	22MF	20%	16V
C111	1-107-310-00	MICA	220PF	5%	500V
C112	1-131-450-00	TANTALUM	1MF	20%	50V
C113	1-131-450-00	TANTALUM	1MF	20%	50V
C114	1-107-274-00	MICA	0.0015MF	5%	100V
C115	1-131-520-00	TANTALUM	22MF	20%	16V
C116	1-107-332-00	MICA	0.0022MF	2%	100V
C117	1-136-230-00	FILM	0.0022MF	3%	100V
C118	1-136-230-00	FILM	0.0022MF	3%	100V
C119	1-136-230-00	FILM	0.0022MF	3%	100V
C120	1-136-230-00	FILM	0.0022MF	3%	100V
C121	1-136-230-00	FILM	0.0022MF	3%	100V
C122	1-136-230-00	FILM	0.0022MF	3%	100V
C123	1-110-193-11	MYLAR	0.01MF	10%	160V
C124	1-107-332-00	MICA	0.0022MF	2%	100V
C125	1-131-450-00	TANTALUM	1MF	20%	50V
C126	1-131-450-00	TANTALUM	1MF	20%	50V
C127	1-131-450-00	TANTALUM	1MF	20%	50V
C128	1-131-450-00	TANTALUM	1MF	20%	50V
C129	1-107-324-00	MICA	0.0039MF	2%	100V
C130	1-107-206-00	MICA	15PF	5%	500V
C131	1-110-193-11	MYLAR	0.01MF	10%	160V
C132	1-131-522-00	TANTALUM	10MF	20%	25V
C133	1-131-522-00	TANTALUM	10MF	20%	25V
C134	1-110-193-11	MYLAR	0.01MF	10%	160V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C135	1-131-450-00	TANTALUM	1MF	20%	50V
C136	1-131-450-00	TANTALUM	1MF	20%	50V
C137	1-110-193-11	MYLAR	0.01MF	10%	160V
C138	1-107-309-00	MICA	100PF	5%	500V
C139	1-107-206-00	MICA	15PF	5%	500V
C140	1-110-193-11	MYLAR	0.01MF	10%	160V
C141	1-131-522-00	TANTALUM	10MF	20%	25V
C142	1-131-522-00	TANTALUM	10MF	20%	25V
C143	1-131-522-00	TANTALUM	10MF	20%	25V
C144	1-130-317-00	FILM	0.068MF	5%	100V
C145	1-107-206-00	MICA	15PF	5%	500V
C146	1-123-323-00	ELECT	470MF	20%	16V
C147	1-123-323-00	ELECT	470MF	20%	16V
C148	1-107-278-00	MICA	7PF	0.5PF	100V
C201	1-131-450-00	TANTALUM	1MF	20%	50V
C202	1-101-003-00	CERAMIC	0.0047MF		50V
C203	1-131-450-00	TANTALUM	1MF	20%	50V
C204	1-131-450-00	TANTALUM	1MF	20%	50V
C206	1-131-522-00	TANTALUM	10MF	20%	25V
C207	1-131-522-00	TANTALUM	10MF	20%	25V
C208	1-131-522-00	TANTALUM	10MF	20%	25V
C209	1-123-334-00	ELECT	220MF	20%	25V
C210	1-131-520-00	TANTALUM	22MF	20%	16V
C211	1-107-310-00	MICA	220PF	5%	500V
C212	1-131-450-00	TANTALUM	1MF	20%	50V
C213	1-131-450-00	TANTALUM	1MF	20%	50V
C214	1-107-274-00	MICA	0.0015MF	5%	100V
C215	1-131-520-00	TANTALUM	22MF	20%	16V
C216	1-107-332-00	MICA	0.0022MF	2%	100V
C217	1-136-230-00	FILM	0.0022MF	3%	100V
C218	1-136-230-00	FILM	0.0022MF	3%	100V
C219	1-136-230-00	FILM	0.0022MF	3%	100V
C220	1-136-230-00	FILM	0.0022MF	3%	100V
C221	1-136-230-00	FILM	0.0022MF	3%	100V
C222	1-136-230-00	FILM	0.0022MF	3%	100V
C223	1-110-193-11	MYLAR	0.01MF	10%	160V
C224	1-107-332-00	MICA	0.0022MF	2%	100V
C225	1-131-450-00	TANTALUM	1MF	20%	50V
C226	1-131-450-00	TANTALUM	1MF	20%	50V
C227	1-131-450-00	TANTALUM	1MF	20%	50V
C228	1-131-450-00	TANTALUM	1MF	20%	50V
C229	1-107-324-00	MICA	0.0039MF	2%	100V
C230	1-107-206-00	MICA	15PF	5%	500V
C231	1-110-193-11	MYLAR	0.01MF	10%	160V
C232	1-131-522-00	TANTALUM	10MF	20%	25V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C233	1-131-522-00	TANTALUM	10MF	20%	25V
C234	1-110-193-11	MYLAR	0.01MF	10%	160V
C235	1-131-450-00	TANTALUM	1MF	20%	50V
C236	1-131-450-00	TANTALUM	1MF	20%	50V
C237	1-110-193-11	MYLAR	0.01MF	10%	160V
C238	1-107-309-00	MICA	100PF	5%	500V
C239	1-107-206-00	MICA	15PF	5%	500V
C240	1-110-193-11	MYLAR	0.01MF	10%	160V
C241	1-131-522-00	TANTALUM	10MF	20%	25V
C242	1-131-522-00	TANTALUM	10MF	20%	25V
C243	1-131-522-00	TANTALUM	10MF	20%	25V
C244	1-130-317-00	FILM	0.068MF	5%	100V
C245	1-107-206-00	MICA	15PF	5%	500V
C248	1-107-278-00	MICA	7PF	0.5PF	100V
C301	1-131-450-00	TANTALUM	1MF	20%	50V
C302	1-125-288-00	ELECT(BLOCK)	100MF	20%	100V
C303	1-125-288-00	ELECT(BLOCK)	100MF	20%	100V
C304	1-107-310-00	MICA	220PF	5%	500V
C305	1-131-450-00	TANTALUM	1MF	20%	50V
C306	1-125-288-00	ELECT(BLOCK)	100MF	20%	100V
C307	1-125-288-00	ELECT(BLOCK)	100MF	20%	100V
C308	1-107-310-00	MICA	220PF	5%	500V
C309	1-131-450-00	TANTALUM	1MF	20%	50V
C310	1-131-522-00	TANTALUM	10MF	20%	25V
C311	1-131-450-00	TANTALUM	1MF	20%	50V
C312	1-131-522-00	TANTALUM	10MF	20%	25V
C313	1-123-359-00	ELECT	47MF	20%	50V
C314	1-123-359-00	ELECT	47MF	20%	50V
C315	1-123-332-00	ELECT	47MF	20%	25V
C316	1-123-332-00	ELECT	47MF	20%	25V
C317	1-125-356-00	ELECT(BLOCK)	2200MF	20%	71V
C318	1-125-356-00	ELECT(BLOCK)	2200MF	20%	71V
C319	1-125-356-00	ELECT(BLOCK)	2200MF	20%	71V
C320	1-125-356-00	ELECT(BLOCK)	2200MF	20%	71V
C321	1-130-673-00	FILM	3.3MF	10%	125V
C322	1-130-321-00	FILM	0.1MF	5%	100V
C323	1-131-522-00	TANTALUM	10MF	20%	25V
C324	1-123-369-00	ELECT	4.7MF	20%	50V
C325	1-123-349-00	ELECT	1000MF	20%	35V
C326	1-131-522-00	TANTALUM	10MF	20%	25V
C327	1-123-333-00	ELECT	100MF	20%	25V
C328	1-131-522-00	TANTALUM	10MF	20%	25V
C329	1-131-522-00	TANTALUM	10MF	20%	25V
C330	1-123-359-00	ELECT	47MF	20%	50V
C331	1-123-369-00	ELECT	4.7MF	20%	50V
C332	1-124-417-00	ELECT	8200MF	20%	16V
C333	1-124-417-00	ELECT	8200MF	20%	16V
C334	1-123-325-00	ELECT	2200MF	20%	16V
C335	1-123-325-00	ELECT	2200MF	20%	16V
C336	1-123-349-00	ELECT	1000MF	20%	35V
C337	1-123-349-00	ELECT	1000MF	20%	35V
C338	1-123-349-00	ELECT	1000MF	20%	35V
C339	1-123-333-00	ELECT	100MF	20%	25V
C341	1-123-333-00	ELECT	100MF	20%	25V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C501	1-136-161-00	FILM	0.047MF	5%	50V
C502	1-124-185-00	ELECT	4.7MF	20%	50V
C503	1-162-207-31	CERAMIC	22PF	5%	50V
C504	1-102-824-00	CERAMIC	470PF	10%	50V
C505	1-162-207-31	CERAMIC	22PF	5%	50V
C509	1-162-293-31	CERAMIC	820PF	10%	50V
C510	1-107-296-00	MICA	68PF	5%	100V
C511	1-104-150-00	POLYSTYRENE	680PF	5%	125V
C512	1-136-162-00	FILM	0.056MF	5%	50V
C513	1-123-308-00	ELECT	220MF	20%	10V
C514	1-162-306-31	CERAMIC	0.01MF	30%	16V
C515	1-107-292-00	MICA	47PF	5%	100V
C516	1-130-772-00	FILM	0.22MF	5%	63V
C517	1-136-173-00	FILM	0.47MF	5%	50V
C518	1-123-308-00	ELECT	220MF	20%	10V
C519	1-162-306-31	CERAMIC	0.01MF	30%	16V
C520	1-102-306-00	CERAMIC	27PF	5%	50V
C521	1-107-304-00	MICA	150PF	5%	100V
C522	1-123-333-00	ELECT	100MF	20%	25V
C523	1-123-322-00	ELECT	330MF	20%	16V
C524	1-123-322-00	ELECT	330MF	20%	16V
C525	1-162-302-31	CERAMIC	0.0022MF	30%	16V
C526	1-123-322-00	ELECT	330MF	20%	16V
C527	1-123-307-00	ELECT	100MF	20%	10V
C528	1-130-776-00	FILM	0.47MF	5%	63V
C529	1-130-776-00	FILM	0.47MF	5%	63V
C530	1-162-304-31	CERAMIC	0.0047MF	30%	16V
C531	1-162-304-31	CERAMIC	0.0047MF	30%	16V
C532	1-108-375-12	MYLAR	0.0068MF	5%	100V
C540	1-123-356-00	ELECT	10MF	20%	50V
C541	1-162-306-31	CERAMIC	0.01MF	30%	16V
C542	1-123-356-00	ELECT	10MF	20%	50V
C543	1-123-356-00	ELECT	10MF	20%	50V
C544	1-123-356-00	ELECT	10MF	20%	50V
C545	1-162-306-31	CERAMIC	0.01MF	30%	16V
C546	1-123-356-00	ELECT	10MF	20%	50V
C547	1-123-356-00	ELECT	10MF	20%	50V
C548	1-123-356-00	ELECT	10MF	20%	50V
C551	1-162-306-31	CERAMIC	0.01MF	30%	16V
C552	1-123-356-00	ELECT	10MF	20%	50V
C553	1-162-306-31	CERAMIC	0.01MF	30%	16V
C554	1-162-306-31	CERAMIC	0.01MF	30%	16V
C555	1-123-356-00	ELECT	10MF	20%	50V
C556	1-162-306-31	CERAMIC	0.01MF	30%	16V
C557	1-123-356-00	ELECT	10MF	20%	50V
C558	1-162-306-31	CERAMIC	0.01MF	30%	16V
C559	1-123-356-00	ELECT	10MF	20%	50V
C560	1-162-306-31	CERAMIC	0.01MF	30%	16V
C561	1-123-356-00	ELECT	10MF	20%	50V
C562	1-162-306-31	CERAMIC	0.01MF	30%	16V
C563	1-123-356-00	ELECT	10MF	20%	50V
C564	1-162-306-31	CERAMIC	0.01MF	30%	16V
C565	1-162-306-31	CERAMIC	0.01MF	30%	16V
C566	1-162-306-31	CERAMIC	0.01MF	30%	16V
C567	1-123-310-00	ELECT	470MF	20%	10V
C568	1-162-306-31	CERAMIC	0.01MF	30%	16V
C569	1-123-310-00	ELECT	470MF	20%	10V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C570	1-162-306-31	CERAMIC	0.01MF	30%	16V
C571	1-162-306-31	CERAMIC	0.01MF	30%	16V
C572	1-162-306-31	CERAMIC	0.01MF	30%	16V
C573	1-123-356-00	ELECT	10MF	20%	50V
C574	1-123-356-00	ELECT	10MF	20%	50V
C575	1-162-306-31	CERAMIC	0.01MF	30%	16V
C576	1-162-306-31	CERAMIC	0.01MF	30%	16V
C577	1-162-306-31	CERAMIC	0.01MF	30%	16V
C578	1-123-356-00	ELECT	10MF	20%	50V
C579	1-162-306-31	CERAMIC	0.01MF	30%	16V
C580	1-162-306-31	CERAMIC	0.01MF	30%	16V
C581	1-123-356-00	ELECT	10MF	20%	50V
C582	1-123-335-00	ELECT	330MF	20%	25V
C583	1-123-335-00	ELECT	330MF	20%	25V
C584	1-123-335-00	ELECT	330MF	20%	25V
C585	1-123-335-00	ELECT	330MF	20%	25V
C586	1-123-330-00	ELECT	22MF	20%	25V
C587	1-162-302-31	CERAMIC	0.0022MF	30%	16V
C588	1-162-302-31	CERAMIC	0.0022MF	30%	16V
C589	1-162-282-31	CERAMIC	100PF	10%	50V
C590	1-162-294-31	CERAMIC	0.001MF	10%	50V
C591	1-162-306-31	CERAMIC	0.01MF	30%	16V
C592	1-131-450-00	TANTALUM	1MF	20%	50V
C701	1-123-343-00	ELECT	33MF	20%	25V
C702	1-123-343-00	ELECT	33MF	20%	25V
C703	1-162-306-31	CERAMIC	0.01MF	30%	16V
C704	1-162-306-31	CERAMIC	0.01MF	30%	16V
C705	1-162-306-31	CERAMIC	0.01MF	30%	16V
C706	1-162-306-31	CERAMIC	0.01MF	30%	16V
C707	1-123-318-00	ELECT	33MF	20%	16V
C708	1-162-306-31	CERAMIC	0.01MF	30%	16V
C709	1-123-318-00	ELECT	33MF	20%	16V
C710	1-162-306-31	CERAMIC	0.01MF	30%	16V
C711	1-123-356-00	ELECT	10MF	20%	50V
C712	1-123-356-00	ELECT	10MF	20%	50V
C713	1-123-356-00	ELECT	10MF	20%	50V
CN001	*1-560-062-00	PIN, CONNECTOR 4P			
CN002	*1-560-604-00	PIN, CONNECTOR 5P			
CN003	*1-560-061-00	PIN, CONNECTOR 3P			
CNJ701	1-507-898-31	JACK, PIN 2P (DIGITAL IN)			
CNJ705	1-507-898-11	JACK, PIN 2P (LINE OUT FIXED)			
CNJ709	1-507-796-21	JACK (HEADPHONES)			
CNJ751	1-507-898-31	JACK, PIN 2P (DIGITAL OUT)			
CNJ755	1-507-898-11	JACK, PIN 2P (LINE OUT VARIABLE)			
CP401⚠	1-231-326-11	(US)....ENCAPSULATED COMPONENT			
CP401⚠	1-231-341-00	(AEP)...ENCAPSULATED COMPONENT			
D101	8-719-100-13	DIODE RD2.7E-B2			
D102	8-719-100-13	DIODE RD2.7E-B2			
D103	8-719-200-46	DIODE 10YD4.5A			

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D104	8-719-951-13	DIODE HZ5CLL
D105	8-719-200-46	DIODE 10YD4.5A
D106	8-719-951-13	DIODE HZ5CLL
D201	8-719-100-13	DIODE RD2.7E-B2
D202	8-719-100-13	DIODE RD2.7E-B2
D203	8-719-200-46	DIODE 10YD4.5A
D204	8-719-951-13	DIODE HZ5CLL
D205	8-719-200-46	DIODE 10YD4.5A
D206	8-719-951-13	DIODE HZ5CLL
D301	8-719-224-12	DIODE 10YD1.3A
D302	8-719-931-07	DIODE EQB01-07
D303	8-719-931-07	DIODE EQB01-07
D304	8-719-224-12	DIODE 10YD1.3A
D305	8-719-224-12	DIODE 10YD1.3A
D306	8-719-224-12	DIODE 10YD1.3A
D307	8-719-200-39	DIODE C16P20F
D308	8-719-200-40	DIODE C16P20FR
D309	8-719-200-31	DIODE 21DQ05
D310	8-719-200-31	DIODE 21DQ05
D311	8-719-200-00	DIODE 31DQ05
D312	8-719-200-00	DIODE 31DQ05
D313	8-719-200-31	DIODE 21DQ05
D314	8-719-200-31	DIODE 21DQ05
D315	8-719-107-57	DIODE 1S953-7
D316	8-719-201-03	DIODE 10DF1
D317	8-719-107-57	DIODE 1S953-7
D318	8-719-201-03	DIODE 10DF1
D501	8-719-101-98	DIODE 1SS97
D502	8-719-101-98	DIODE 1SS97
D503	8-719-101-98	DIODE 1SS97
D504	8-719-300-02	DIODE SV-02
D505	8-719-910-67	DIODE HZ6C1L
D506	8-719-107-57	DIODE 1S953-7
D507	8-719-107-57	DIODE 1S953-7
D508	8-719-107-57	DIODE 1S953-7
D509	8-719-100-57	DIODE RD10E-B2
D510	8-719-107-57	DIODE 1S953-7
D511	8-719-107-57	DIODE 1S953-7
F401⚠	1-532-078-00	(AEP)...FUSE, TIME-LAG
F401⚠	1-532-268-XX	(US)....FUSE, GLASS TUBE
IC001	8-759-202-11	IC TC74HC00P
IC002	8-759-202-22	IC TC74HC74P
IC003	8-759-801-74	IC CX20198
IC101	8-759-906-73	IC SN74LS673N
IC102	8-759-915-29	IC PCM53JG-1
IC103	8-759-700-18	IC NJM78M20A
IC104	8-759-240-66	IC TC4066BP
IC105	8-759-903-56	IC LF356H
IC106	8-759-900-72	IC NE5532P
IC107	8-759-900-72	IC NE5532P
IC108	8-759-900-72	IC NE5532P
IC109	8-759-801-74	IC CX20198

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
IC201	8-759-906-73	IC SN74LS673N
IC202	8-759-915-29	IC PCM53JG-1
IC203	8-759-700-18	IC NJM78M20A
IC204	8-759-240-66	IC TC4066BP
IC205	8-759-903-56	IC LF356H
IC206	8-759-900-72	IC NE5532P
IC207	8-759-900-72	IC NE5532P
IC208	8-759-900-72	IC NE5532P
IC209	8-759-801-74	IC CX20198
IC301	8-759-170-15	IC UPC78M15H
IC302	8-759-700-54	IC NJM7809A
IC304	8-759-171-05	IC UPC7805H
IC305	8-759-700-20	IC NJM79M05A
IC501	8-759-202-11	IC 74HC00P
IC502	8-759-202-21	IC TC74HC32P
IC503	8-759-202-13	IC TC74HCU04P
IC504	8-759-900-86	IC SN74LS86N
IC505	8-759-901-23	IC SN74LS123N
IC506	8-759-040-44	IC MC4044P
IC507	8-759-906-24	IC SN74LS624N
IC508	8-759-903-93	IC SN74LS393N
IC509	8-759-900-74	IC SN74LS74AN
IC510	8-759-915-26	IC CX23053
IC511	8-759-900-04	IC SN74LS04N
IC512	8-759-700-81	IC NJM555D
IC514	8-759-912-53	IC CX23034
IC515	8-759-202-22	IC TC74HC74P
IC516	8-759-903-93	IC SN74LS393N
IC517	8-759-906-24	IC SN74LS624N
IC518	8-759-040-44	IC MC4044P
IC519	8-759-903-93	IC SN74LS393N
IC520	8-759-901-12	IC SN74LS112AN
IC521	8-759-202-21	IC TC74HC32P
IC522	8-759-202-23	IC TC74HC76P
IC523	8-759-910-83	IC TL072ACP
IC524	8-759-040-44	IC MC4044P
IC525	8-759-901-12	IC SN74LS112AN
IC526	8-759-900-02	IC SN74LS02N
IC527	8-759-900-02	IC SN74LS02N
IC528	8-759-645-19	IC M54519P
IC529	8-759-202-17	IC TC74HC14P
IC530	8-759-202-22	IC TC74HC74P
IC531	8-759-202-22	IC TC74HC74P
IC701	8-759-202-13	IC TC74HCU04P
IC702	8-759-202-13	IC TC74HCU04P
L501	1-408-559-00	MICRO INDUCTOR 4.7UH
L502	1-408-559-00	MICRO INDUCTOR 4.7UH
L503	1-408-559-00	MICRO INDUCTOR 4.7UH
L504	1-408-559-00	MICRO INDUCTOR 4.7UH
L505	1-408-559-00	MICRO INDUCTOR 4.7UH
L506	1-408-559-00	MICRO INDUCTOR 4.7UH
L507	1-408-559-00	MICRO INDUCTOR 4.7UH
L508	1-408-559-00	MICRO INDUCTOR 4.7UH
L509	1-408-559-00	MICRO INDUCTOR 4.7UH
L510	1-408-559-00	MICRO INDUCTOR 4.7UH

ELECTRICAL PARTS

Ref.No.	Part No.	Description
L511	1-408-559-00	MICRO INDUCTOR 4.7UH
L512	1-408-559-00	MICRO INDUCTOR 4.7UH
L513	1-408-559-00	MICRO INDUCTOR 4.7UH
PL801	1-518-518-41	LAMP, PILOT (2)
PL802	1-518-518-41	LAMP, PILOT (1)
PL803	1-518-518-41	LAMP, PILOT (32kHz)
PL804	1-518-518-41	LAMP, PILOT (44kHz)
PL805	1-518-518-41	LAMP, PILOT (48kHz)
PL806	1-518-518-71	LAMP, PILOT (MUTING)
PL807	1-518-518-41	LAMP, PILOT (OPERATING)
PTH301	1-806-882-11	(US)...THERMISTOR (POSITIVE)
PTH302	1-806-882-11	(US)...THERMISTOR (POSITIVE)
Q301	8-729-127-53	TRANSISTOR 2SC2275-P
Q302	8-729-104-91	TRANSISTOR 2SA1383
Q303	8-729-104-91	TRANSISTOR 2SA1383
Q304	8-729-104-18	TRANSISTOR 2SC3514
Q305	8-729-104-18	TRANSISTOR 2SC3514
Q306	8-729-118-53	TRANSISTOR 2SA985-P
Q307	8-729-104-18	TRANSISTOR 2SC3514
Q308	8-729-104-18	TRANSISTOR 2SC3514
Q309	8-729-104-91	TRANSISTOR 2SA1383
Q310	8-729-104-91	TRANSISTOR 2SA1383
Q311	8-729-304-62	TRANSISTOR 2SB646A
Q312	8-729-304-62	TRANSISTOR 2SB646A
Q313	8-729-300-62	TRANSISTOR 2SD666A
Q314	8-729-304-62	TRANSISTOR 2SB646A
Q315	8-729-300-62	TRANSISTOR 2SD666A
Q316	8-729-300-62	TRANSISTOR 2SD666A
Q317	8-729-900-36	TRANSISTOR DTC124ES
Q318	8-729-900-36	TRANSISTOR DTC124ES
Q319	8-729-300-62	TRANSISTOR 2SD666A
Q323	8-729-103-43	TRANSISTOR 2SB734
Q324	8-729-900-36	TRANSISTOR DTC124ES
Q326	8-729-103-43	TRANSISTOR 2SB734
Q327	8-729-900-36	TRANSISTOR DTC124ES
Q501	8-729-204-83	TRANSISTOR 2SA1048-GR
Q502	8-729-178-55	TRANSISTOR 2SC2785-E
Q503	8-729-178-55	TRANSISTOR 2SC2785-E
R101	1-247-823-00	CARBON 470 5% 1/6W
R102	1-247-823-00	CARBON 470 5% 1/6W
R103	1-247-823-00	CARBON 470 5% 1/6W
R104	1-247-823-00	CARBON 470 5% 1/6W
R105	1-247-823-00	CARBON 470 5% 1/6W
R106	1-247-823-00	CARBON 470 5% 1/6W
R107	1-247-823-00	CARBON 470 5% 1/6W
R108	1-247-823-00	CARBON 470 5% 1/6W
R109	1-247-823-00	CARBON 470 5% 1/6W
R110	1-247-823-00	CARBON 470 5% 1/6W
R111	1-247-823-00	CARBON 470 5% 1/6W
R112	1-247-823-00	CARBON 470 5% 1/6W
R113	1-247-823-00	CARBON 470 5% 1/6W
R114	1-247-823-00	CARBON 470 5% 1/6W
R115	1-247-823-00	CARBON 470 5% 1/6W
R116	1-247-823-00	CARBON 470 5% 1/6W
R118	1-247-855-00	CARBON 10K 5% 1/6W
R119	1-214-753-00	METAL 10K 1% 1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R120	1-214-753-00	METAL	10K	1%	1/4W
R123	1-214-761-00	METAL	22K	1%	1/4W
R124	1-214-723-00	METAL	560	1%	1/4W
R125	1-214-721-00	METAL	470	1%	1/4W
R126	1-214-761-00	METAL	22K	1%	1/4W
R127	1-214-721-00	METAL	470	1%	1/4W
R128	1-215-232-00	METAL	1K	1%	1W
R129	1-214-852-00	METAL	330	1%	1/2W
R130	1-214-846-00	METAL	180	1%	1/2W
R131	1-214-838-61	METAL	82	1%	1/2W
R132	1-214-830-00	METAL	39	1%	1/2W
R133	1-214-872-00	METAL	2.2K	1%	1/2W
R134	1-214-909-61	METAL	68K	1%	1/2W
R135	1-214-873-00	METAL	2.4K	1%	1/2W
R136	1-214-873-00	METAL	2.4K	1%	1/2W
R137	1-214-878-00	METAL	3.9K	1%	1/2W
R138	1-214-880-00	METAL	4.7K	1%	1/2W
R139	1-214-873-00	METAL	2.4K	1%	1/2W
R140	1-214-873-00	METAL	2.4K	1%	1/2W
R141	1-214-879-00	METAL	4.3K	1%	1/2W
R142	1-214-880-00	METAL	4.7K	1%	1/2W
R143	1-214-873-00	METAL	2.4K	1%	1/2W
R144	1-214-873-00	METAL	2.4K	1%	1/2W
R145	1-214-878-00	METAL	3.9K	1%	1/2W
R146	1-214-872-00	METAL	2.2K	1%	1/2W
R147	1-214-867-00	METAL	1.3K	1%	1/2W
R148	1-214-904-00	METAL	43K	1%	1/2W
R149	1-214-990-00	METAL	3.3K	1%	1W
R150	1-214-868-00	METAL	1.5K	1%	1/2W
R151	1-215-813-00	METAL	12K	1%	1W
R152	1-214-937-00	METAL	1M	1%	1/2W
R153	1-214-840-00	METAL	100	1%	1/2W
R154	1-214-840-00	METAL	100	1%	1/2W
R155	1-214-929-00	METAL	470K	1%	1/2W
R156	1-214-848-00	METAL	220	1%	1/2W
R157	1-214-929-00	METAL	470K	1%	1/2W
R158	1-215-258-11	METAL	4.7K	1%	1W
R159	1-214-991-00	METAL	8.2K	1%	1W
R160	1-214-840-00	METAL	100	1%	1/2W
R161	1-214-929-00	METAL	470K	1%	1/2W
R162	1-214-903-00	METAL	39K	1%	1/2W
R163	1-214-899-61	METAL	27K	1%	1/2W
R164	1-214-900-00	METAL	30K	1%	1/2W
R165	1-214-840-00	METAL	100	1%	1/2W
R166	1-214-840-00	METAL	100	1%	1/2W
R167	1-214-924-00	METAL	300K	1%	1/2W
R168	1-214-840-00	METAL	100	1%	1/2W
R171	1-214-903-00	METAL	39K	1%	1/2W
R172	1-214-860-00	METAL	680	1%	1/2W
R201	1-247-823-00	CARBON	470	5%	1/6W
R202	1-247-823-00	CARBON	470	5%	1/6W
R203	1-247-823-00	CARBON	470	5%	1/6W
R204	1-247-823-00	CARBON	470	5%	1/6W
R205	1-247-823-00	CARBON	470	5%	1/6W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R206	1-247-823-00	CARBON	470	5%	1/6W
R207	1-247-823-00	CARBON	470	5%	1/6W
R208	1-247-823-00	CARBON	470	5%	1/6W
R209	1-247-823-00	CARBON	470	5%	1/6W
R210	1-247-823-00	CARBON	470	5%	1/6W
R211	1-247-823-00	CARBON	470	5%	1/6W
R212	1-247-823-00	CARBON	470	5%	1/6W
R213	1-247-823-00	CARBON	470	5%	1/6W
R214	1-247-823-00	CARBON	470	5%	1/6W
R215	1-247-823-00	CARBON	470	5%	1/6W
R216	1-247-823-00	CARBON	470	5%	1/6W
R218	1-247-855-00	CARBON	10K	5%	1/6W
R219	1-214-753-00	METAL	10K	1%	1/4W
R220	1-214-753-00	METAL	10K	1%	1/4W
R223	1-214-761-00	METAL	22K	1%	1/4W
R224	1-214-723-00	METAL	560	1%	1/4W
R225	1-214-721-00	METAL	470	1%	1/4W
R226	1-214-761-00	METAL	22K	1%	1/4W
R227	1-214-721-00	METAL	470	1%	1/4W
R228	1-215-232-00	METAL	1K	1%	1W
R229	1-214-852-00	METAL	330	1%	1/2W
R230	1-214-846-00	METAL	180	1%	1/2W
R231	1-214-838-61	METAL	82	1%	1/2W
R232	1-214-830-00	METAL	39	1%	1/2W
R233	1-214-872-00	METAL	2.2K	1%	1/2W
R234	1-214-909-61	METAL	68K	1%	1/2W
R235	1-214-873-00	METAL	2.4K	1%	1/2W
R236	1-214-873-00	METAL	2.4K	1%	1/2W
R237	1-214-878-00	METAL	3.9K	1%	1/2W
R238	1-214-880-00	METAL	4.7K	1%	1/2W
R239	1-214-873-00	METAL	2.4K	1%	1/2W
R240	1-214-873-00	METAL	2.4K	1%	1/2W
R241	1-214-879-00	METAL	4.3K	1%	1/2W
R242	1-214-880-00	METAL	4.7K	1%	1/2W
R243	1-214-873-00	METAL	2.4K	1%	1/2W
R244	1-214-873-00	METAL	2.4K	1%	1/2W
R245	1-214-878-00	METAL	3.9K	1%	1/2W
R246	1-214-872-00	METAL	2.2K	1%	1/2W
R247	1-214-867-00	METAL	1.3K	1%	1/2W
R248	1-214-904-00	METAL	43K	1%	1/2W
R249	1-214-990-00	METAL	3.3K	1%	1W
R250	1-214-868-00	METAL	1.5K	1%	1/2W
R251	1-215-813-00	METAL	12K	1%	1W
R252	1-214-937-00	METAL	1M	1%	1/2W
R253	1-214-840-00	METAL	100	1%	1/2W
R254	1-214-840-00	METAL	100	1%	1/2W
R255	1-214-929-00	METAL	470K	1%	1/2W
R256	1-214-848-00	METAL	220	1%	1/2W
R257	1-214-929-00	METAL	470K	1%	1/2W
R258	1-215-258-11	METAL	4.7K	1%	1W
R259	1-214-991-00	METAL	8.2K	1%	1W
R260	1-214-840-00	METAL	100	1%	1/2W
R261	1-214-929-00	METAL	470K	1%	1/2W
R262	1-214-903-00	METAL	39K	1%	1/2W
R263	1-214-899-61	METAL	27K	1%	1/2W
R264	1-214-900-00	METAL	30K	1%	1/2W
R267	1-214-924-00	METAL	300K	1%	1/2W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R268	1-214-840-00	METAL	100	1%	1/2W
R271	1-214-903-00	METAL	39K	1%	1/2W
R272	1-214-860-00	METAL	680	1%	1/2W
R301	1-214-705-00	METAL	100	1%	1/4W
R302	1-214-852-00	METAL	330	1%	1/2W
R303	1-214-991-00	METAL	8.2K	1%	1W
R304	1-214-991-00	METAL	8.2K	1%	1W
R305	1-214-860-00	METAL	680	1%	1/2W
R306	1-214-860-00	METAL	680	1%	1/2W
R307	1-214-991-00	METAL	8.2K	1%	1W
R308	1-214-991-00	METAL	8.2K	1%	1W
R309	1-214-852-00	METAL	330	1%	1/2W
R310	1-214-705-00	METAL	100	1%	1/4W
R311	1-214-874-00	METAL	2.7K	1%	1/2W
R312	1-214-850-00	METAL	270	1%	1/2W
R313	1-214-850-00	METAL	270	1%	1/2W
R314	1-214-874-00	METAL	2.7K	1%	1/2W
R315	1-214-733-00	METAL	1.5K	1%	1/4W
R316	1-214-733-00	METAL	1.5K	1%	1/4W
R317	1-214-705-00	METAL	100	1%	1/4W
R318	1-214-880-00	METAL	4.7K	1%	1/2W
R319	1-214-880-00	METAL	4.7K	1%	1/2W
R320	1-214-705-00	METAL	100	1%	1/4W
R321	1-214-737-00	METAL	2.2K	1%	1/4W
R322	1-214-753-00	METAL	10K	1%	1/4W
R323	1-214-729-00	METAL	1K	1%	1/4W
R324	1-214-729-00	METAL	1K	1%	1/4W
R325	1-214-753-00	METAL	10K	1%	1/4W
R326	1-214-737-00	METAL	2.2K	1%	1/4W
R327	1-214-729-00	METAL	1K	1%	1/4W
R328	1-214-729-00	METAL	1K	1%	1/4W
R329	1-214-699-00	(AEP)...RES,METAL FILM 56			
R329 ⚠	1-217-396-00	(US)....FUSIBLE	56	5%	1/4W F
R330	1-214-699-00	(AEP)...RES,METAL FILM 56			
R330 ⚠	1-217-396-00	(US)....FUSIBLE	56	5%	1/4W F
R331	1-214-816-00	(AEP)...RES,METAL FILM 10			
R331 ⚠	1-217-434-00	(US)....FUSIBLE	10	5%	1/2W F
R332	1-214-729-00	METAL	1K	1%	1/4W
R333	1-214-753-00	METAL	10K	1%	1/4W
R334	1-214-765-00	METAL	33K	1%	1/4W
R335	1-214-761-00	METAL	22K	1%	1/4W
R336	1-214-777-00	METAL	100K	1%	1/4W
R337	1-214-777-00	METAL	100K	1%	1/4W
R342	1-214-709-00	METAL	150	1%	1/4W
R343	1-214-709-00	METAL	150	1%	1/4W
R344	1-214-753-00	METAL	10K	1%	1/4W
R345	1-214-741-00	METAL	3.3K	1%	1/4W
R347	1-214-741-00	METAL	3.3K	1%	1/4W
R348	1-214-753-00	METAL	10K	1%	1/4W
R349	1-214-705-00	METAL	100	1%	1/4W
R350	1-214-705-00	METAL	100	1%	1/4W
R501	1-247-823-00	CARBON	470	5%	1/6W
R502	1-247-855-00	CARBON	10K	5%	1/6W
R503	1-247-855-00	CARBON	10K	5%	1/6W
R504	1-247-855-00	CARBON	10K	5%	1/6W
R505	1-247-855-00	CARBON	10K	5%	1/6W
R506	1-247-903-00	CARBON	1M	5%	1/6W

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R507	1-247-842-00	CARBON	3K	5%	1/6W
R508	1-247-855-00	CARBON	10K	5%	1/6W
R509	1-247-866-00	CARBON	30K	5%	1/6W
R510	1-247-859-00	CARBON	15K	5%	1/6W
R511	1-247-855-00	CARBON	10K	5%	1/6W
R512	1-247-847-00	CARBON	4.7K	5%	1/6W
R513	1-247-847-00	CARBON	4.7K	5%	1/6W
R514	1-247-831-00	CARBON	1K	5%	1/6W
R515	1-247-847-00	CARBON	4.7K	5%	1/6W
R517	1-249-421-11	CARBON	2.2K	5%	1/6W
R518	1-247-855-00	CARBON	10K	5%	1/6W
R519	1-247-855-00	CARBON	10K	5%	1/6W
R520	1-249-421-11	CARBON	2.2K	5%	1/6W
R521	1-247-855-00	CARBON	10K	5%	1/6W
R522	1-247-855-00	CARBON	10K	5%	1/6W
R523	1-247-855-00	CARBON	10K	5%	1/6W
R524	1-247-855-00	CARBON	10K	5%	1/6W
R525	1-247-855-00	CARBON	10K	5%	1/6W
R526	1-247-855-00	CARBON	10K	5%	1/6W
R527	1-247-901-00	CARBON	820K	5%	1/6W
R528	1-247-852-00	CARBON	7.5K	5%	1/6W
R529	1-247-831-00	CARBON	1K	5%	1/6W
R530	1-247-847-00	CARBON	4.7K	5%	1/6W
R531	1-247-847-00	CARBON	4.7K	5%	1/6W
R532	1-247-817-00	CARBON	270	5%	1/6W
R533	1-247-827-00	CARBON	680	5%	1/6W
R534	1-247-855-00	CARBON	10K	5%	1/6W
R535	1-247-843-00	CARBON	3.3K	5%	1/6W
R536	1-247-835-00	CARBON	1.5K	5%	1/6W
R537	1-247-901-00	CARBON	820K	5%	1/6W
R538	1-247-843-00	CARBON	3.3K	5%	1/6W
R539	1-247-847-00	CARBON	4.7K	5%	1/6W
R540	1-247-811-00	CARBON	150	5%	1/6W
R541	1-247-831-00	CARBON	1K	5%	1/6W
R542	1-247-831-00	CARBON	1K	5%	1/6W
R543	1-247-791-00	CARBON	22	5%	1/6W
R544	1-247-783-00	CARBON	10	5%	1/6W
R545	1-247-783-00	CARBON	10	5%	1/6W
R546	1-247-783-00	CARBON	10	5%	1/6W
R547	1-247-783-00	CARBON	10	5%	1/6W
R548	1-247-783-00	CARBON	10	5%	1/6W
R549	1-247-783-00	CARBON	10	5%	1/6W
R550	1-249-421-11	CARBON	2.2K	5%	1/6W
R551	1-247-867-00	CARBON	33K	5%	1/6W
R552	1-247-867-00	CARBON	33K	5%	1/6W
R553	1-247-867-00	CARBON	33K	5%	1/6W
R554	1-247-895-00	CARBON	470K	5%	1/6W
R555	1-247-855-00	CARBON	10K	5%	1/6W
R556	1-247-855-00	CARBON	10K	5%	1/6W
R557	1-247-903-00	CARBON	1M	5%	1/6W
R560	1-247-831-00	CARBON	1K	5%	1/6W
R561	1-247-831-00	CARBON	1K	5%	1/6W
R562	1-247-855-00	CARBON	10K	5%	1/6W
R563	1-249-421-11	CARBON	2.2K	5%	1/6W
R564	1-247-823-00	CARBON	470	5%	1/6W
R565	1-247-827-00	CARBON	680	5%	1/6W
R566	1-247-863-00	CARBON	22K	5%	1/6W

DAS-702ES

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R567	1-247-815-00	CARBON	220	5%	1/6W
R701	1-247-804-00	CARBON	75	5%	1/6W
R702	1-247-804-00	CARBON	75	5%	1/6W
R703	1-247-871-00	CARBON	47K	5%	1/6W
R704	1-247-871-00	CARBON	47K	5%	1/6W
R705	1-247-804-00	CARBON	75	5%	1/6W
R706	1-247-804-00	CARBON	75	5%	1/6W
R707	1-249-421-11	CARBON	2.2K	5%	1/6W
R708	1-249-421-11	CARBON	2.2K	5%	1/6W
RT501	1-224-252-XX	RES, ADJ, METAL GLAZE 10K			
RV001	1-228-604-00	RES, VAR, CARBON 100K/100K			
RY001	1-515-473-00	RELAY			
RY002	1-515-473-00	RELAY			
RY101	1-515-473-00	RELAY			
RY102	1-515-473-00	RELAY			
RY201	1-515-473-00	RELAY			
RY202	1-515-473-00	RELAY			
S101	1-554-316-00	SWITCH, DIP			
S201	1-554-316-00	SWITCH, DIP			
S401	1-554-880-11	SWITCH, PUSH (AC POWER)(1 KEY)			
S501	1-552-719-00	SWITCH, AC			
T401 ⚠	1-448-206-11	(US)....TRANSFORMER, POWER			
T401 ⚠	1-448-217-11	(AEP)...TRANSFORMER, POWER			
T701	1-459-587-11	COIL (WITH CORE)			
T702	1-459-587-11	COIL (WITH CORE)			
TH501	1-800-200-00	THERMISTOR S-3K			

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ACCESSORY & PACKING MATERIAL

Part No.	Description
1-556-942-00	CORD, CONNECTION
1-557-817-11	CORD, CONNECTION
2-297-403-00	SHEET (LARGE), PROTECTION
3-701-630-00	BAG, POLYETHYLENE
3-703-710-41	STICKER, SONY SYMBOL (12)
3-760-236-11	MANUAL, INSTRUCTION
4-876-631-00	CUSHION (FRONT)
4-876-632-00	CUSHION (REAR)
4-909-143-01	(US)....INDIVIDUAL CARTON
4-909-144-01	(AEP)...INDIVIDUAL CARTON

9 -951-625-11

Sony Corporation

English
85G0686-1
Printed in Japan
©1985